4: Grajdanzev--44 S-4 (no date) 1942 Formosans
116, 161, 433, 464, 471

"Two thousand yen per ko (2.4 acres) is an apalling [sic] price where the daily wages of a worker are about one yen per day, and it prevents the landless from having a chance to become owners of land. However, the phrase 'population pressure' is not used here in the Malthusian sense. The question is not one of food--the island produces twice as much as the islanders consume--but of employment. Openings in industry are few; independent industrial enterprise is almost impossible because a plant worth a few hundred or thousand yen cannot compete with a modern factory. The only occupation left is that of the farmer--a customary occupation for the majority of the islanders. The rise in land values is a symptom of the growing difficulty of finding employment, and not of a growing scarcity of food."

4:Grajdanzev--46-47 S-4 (no date) 1942 Formosans-1-3
116, 171, 241, 454, 433, 177.24 Japan
636.24

"(3) Increased agricultural production may also be achieved by raising yields per unit of area. Below we give a comparison of yields in Taiwan and in Japan, and in the case of sugar cane, the area of which in Japan is too small, a comparison with Hawaii and the Netherlands Indies, where conditions are similar to those in Taiwan, while groundnut production in Taiwan is compared to that of Kwantung.

Crop Yields In Quintals Per Hectare in Taiwan and Other Countries.

		1928-32 average	1933-37 average	1937
Wheat	Taiwan	8.7	9.7	10.7
	Japan	17.7	19.1	19.1
Barley	Taiwan	6.4	8.0	7.4
	Japan	19.9	20.6	20.9
Maize	Taiwan	11.3	10.8	11.6
	Japan	14.1	14.7	16.7
Rice	Taiwan	22.2	25.1	26.1
	Japan	35.0	36.8	38.6
Sugar cane	Taiwan	684.4	654.4* Four-year average 1933-36.	...
	N. E. I.	1,308.0	1,374* Four-year average 1933-36.	...
	Hawaii	1,349.4	1,515* Four-year average 1933-36.	...

		1928-32 average	1933-37 average	1937
Soya beans	Taiwan	5.6	5.7	6.2
	Japan	10.0	10.0	11.2
Groundnuts	Taiwan	16.2	17.1	18.4
	Kwantung	19.0	20.7	...
Sesamum	Taiwan	3.5	3.9	4.2
	Japan	7.3	7.5	7.5

The yields per hectare of the most important plants in Taiwan's economy are therefore thirty to fifty per cent less than in Japan, or, in the case of sugar, in Hawaii or the Netherlands East Indies, and yet all available sources mention the fertility of the soil in Taiwan, while climatic conditions are at least as good as in Japan or the Netherlands Indies.

The explanation lies in the primitive methods of Taiwan [47] agriculture, including the slight use of fertilizers. Judging by the cultivated area and the number of farmers, the island should have at least 300,000 to 400,000 ploughs, but in 1929 (1) almost all (except

1. The last data available, Nogyo nenkan, p. 642.

18,315 'improved' ploughs for deeper ploughing and 614 of the European type) were of the

primitive Chinese pattern. While in Japan proper an average of ¥170 to ¥180 per hectare is spent each year on commercial and home-prepared fertilizers, in Taiwan less than half that sum is spent for this purpose. These two examples—ploughs and fertilizers—for which quantitative data are available show clearly that Taiwan farming is under-capitalized, especially when we consider that the farmer is obliged to pay ¥2,000 per ko for good land.

This does not of course mean that there is no improvement in the agriculture of Taiwan. The government devotes much effort to increasing the productivity of the farms and the farmers are eager to respond. Yields are now higher than they were twenty years ago, as one may see from the tables given later in this chapter. But progress is slow. It is doubtful whether yields in Japan in 1895—the time of the annexation of the island—were higher than in Taiwan, whereas now they are considerably greater and relatively Taiwan is lagging further and further behind."

4: Grajdanzev--47-48 S-4 (no date) 1942 Formosans
116, 433, 435, 177.43, Japan
636.43

"Furthermore, as will be shown later, the results of the improvements which did take place brought most profit to landowners, traders and the Japanese administration. This may appear to be contradicted by the fact that the gross value of agricultural production in Taiwan for the last five years increased from ¥237.9 million in 1933 to ¥413.7 million in 1937 (seventy-four per cent), and if later data were available they would certainly be still higher. Unfortunately, we do not have at our disposal an index of agricultural prices in Taiwan (1). However, we do know that the average price of [48]

1. The general index of wholesale prices in Taihoku had increased, compared with 1933, by 33 per cent in 1937 and 58 per cent in 1938. Taiwan Jijo, 1939 pp. 606, 607.

rice for the same period rose from ¥14.98 per koku to ¥22.74, or by fifty-two per cent, and rice makes up about half of the gross value of agricultural production in Taiwan. In the same years population increased by only thirteen per cent. By deflating prices to the level of 1933 and dividing by an index of population, we find some evidence that production per capita was less in real value in 1937 than in 1933. How generally this is true is difficult to say because of the paucity and unreliable character of the data. But one thing is clear: no rapid rise in the per capita value of agricultural production has taken place in the last few years."

4: Grajdanzev--48 S-4 (no date) 1942 Formosans
116, 241, 433

"Before we examine the progress that has been made in the production of the most important crops, let us try to evaluate their relative importance in the agriculture of Taiwan. The following table [See following slips, page 49 for table--analyst] gives their gross value for several years (1). It would, of course, be much better to have net

1. Only those products are given, the gross value of which is now over one million yen.

values, i.e. the gross value minus cost of materials, used in production, but these are not available.

This table reveals that Taiwan is an island of two main crops--rice, which accounts for more than half the gross value, and sugar cane."

4:Grajdanzev--49-51 S-4 (no date) 1942 Formosans-1-5
116, 241, 433

"Gross Value of Agricultural Production in Taiwan
(Million yen)

	1921	1933	1935	1936	1937	1938
Rice	88.7	124.9	197.2	214.0	208.8	237.9
Sugar cane	38.9	29.0	55.2	54.4	64.3	78.2
Sweet potatoes	15.9	20.5	25.4	38.3	27.9	29.5
Bananas	5.9	5.7	6.6	6.8	8.1	10.0
Pineapples	.4	2.0	2.6	3.1	3.1	4.0
Groundnuts	1.9	2.3	3.5	3.9	4.1	3.9
Jute	.5	.8	1.8	1.4	1.5	2.5
Tea	4.0	3.9	6.4	7.4	10.3	9.2
Tobacco	1.0	.9	1.2	1.6	2.1	2.6
Cassava	...	...	...	...	1.4	1.2
Other cereals, beans, vegetables, fruits	12.5	15.7	20.1	11.4	27.2	26.3
Animal products	31.6	32.2	41.0	46.0	49.2	54.9
Total	201.3	237.9	361.0	388.3	413.7	460.2
As percentages of total						
Rice	44.1	52.5	54.6	55.1	50.5	51.7
Sugar cane	19.3	12.2	15.3	14.0	15.5	17.0
Sweet potatoes	7.9	8.6	7.0	9.9	6.7	6.4

4:Grajdanzev--49-51 S-4 (no date) 1942 Formosans-2
116, 241, 433

As percentages of total	1921	1933	1935	1936	1937	1938
Bananas	2.9	2.4	1.8	1.8	2.0	2.2
Pineapples	.2	.8	.7	.8	0.8	0.9
Groundnuts	.9	1.0	1.0	1.0	1.0	0.8
Jute	.3	.3	.5	.3	0.4	0.5
Tea	2.0	1.6	1.8	1.9	2.5	2.0
Tobacco	.5	.4	.3	.4	0.5	0.6
Cassava	...	...	...	...	0.3	0.3
Other cereals, etc.	6.2	6.6	5.6	2.9	7.9	5.7
Animal products	15.7	13.6	11.4	11.9	11.9	11.9
Total	100	100	100	100	100	100

[50]

Crop Area In Taiwan
(1,000 ko)

	1921	1933	1935	1936	1937	1938
Rice	510.8	694.4	699.7	702.7	678.1	644.8
Sugar cane	119.9	84.3	121.6	128.3	124.6	134.2
Sweet potatoes	124.5	138.1	142.5	144.5	143.3	138.7
Bananas	6.1	19.2	22.8	24.2	24.1	23.9
Pineapples	1.3	6.6	7.0	8.0	8.9	8.9
Groundnuts	24.4	30.7	31.5	31.7	32.4	32.1

Crop Area In Taiwan [Cont.]
(1,000 ko)

	1921	1933	1935	1936	1937	1938
Jute	2.1	3.0	7.2	5.5	5.2	8.6
Tea	39.1	45.8	42.6	43.0	43.5	43.4
Tobacco	1.4	.8	1.1	1.3	1.5	1.7
All others	190.4	134.1	102.7	109.4	154.2	179.7
Total*	1,020 †	1,159 †	1,176	1,200	1,216	1,216

* Since the figures of total crop area are not available, the total was calculated in the following way: to the total cultivated area is added the double-crop area of paddy fields for each year. The line 'others' was secured by subtraction from the total.

Source: Nogyo nenkan, 1939-40, pp. 640, 647-652; for 1938, Takumu tokei.

† Approximate figures.

As percentages of total

	1921	1933	1935	1936	1937	1938
Rice	50.2	60.0	59.4	58.5	55.8	53.0
Sugar cane	11.7	7.3	10.3	10.7	10.2	11.0
Sweet potatoes	12.2	11.9	12.1	12.0	11.8	11.4
Bananas	.6	1.7	1.9	2.0	2.0	2.0
Pineapples	.1	.6	.6	.7	.7	.7
Groundnuts	2.4	2.6	2.7	2.6	2.7	2.7
Jute	.2	.3	.6	.5	.4	.7
Tea	3.8	4.0	3.6	3.7	3.6	3.6
Tobacco	.1	.1	.1	.1	.1	.1
All others	18.7	11.5	8.7	9.1	12.7	14.8
Total	100	100	100	100	100	100

[51] Rice occupies a predominant position in this table also—from fifty to sixty per cent of the crop area is under rice—but here second place is occupied by sweet potatoes, while sugar cane is third. Then, in order of importance, come tea, groundnuts, bananas, pineapples, jute, and tobacco. It would be a mistake to conclude by comparing percentages of value and of area in the last two tables that rice, for example, is less profitable to cultivate in Taiwan than sugar cane, because in 1937 rice occupied 55.8 per cent of the

area and brought only 51.8 per cent in value, while for sugar cane the corresponding percentages were 10.2 and 16.0. Even if one ignores the cost of labor, one must take into consideration the following circumstances: the growth-cycle of sugar cane is eighteen months in Taiwan, while on more than half the area under rice two crops are taken yearly; sugar cane demands a greater amount of fertilizer, which must be purchased. These considerations suggest that the unwillingness on the part of the farmers to plant more sugar cane for sugar companies is probably due not only to the conservatism of the farmer, but is based on sound judgement. Again, the fact that the area under sweet potatoes is 11.8 per cent while the value is 6.9 per cent cannot be taken as proof that sweet potato culture is less profitable to the farmer than sugar cane. They are now consumed largely on the farm, and if the farmers were to reduce the existing acreage of sweet potatoes, their price would be quite different from what it is now."

4:Grajdanzev--60-61 S-4 (no date) 1942 Formosans-1-2
116, 249, 433, 458, 654, 177.24 Japan
636.24

"There can be no doubt as to the importance of sugar cane cultivation and of the sugar industry in Taiwan and the degree of success achieved by the Japanese government and Chinese cultivators.

However, a close examination of the table [See page 59, category 116--analyst] reveals some interesting features. It was pointed out how much effort was expended by the officials on the improvement of sugar cane culture. But in spite of all the efforts of the government and of the experimental stations the yield per ko did not show any signs of improvement during the first fifteen years. If the development was as steady as is officially described, why then was the increase of production up to 1921 taking place exclusively as a result of the increase in the planted area?

Further, the increase in sugar production may also come through the increase of sugar content in the juice of the sugar cane. It is interesting to note that in this respect too, little, if any, improvement is noticed up to 1922, but that after that year the sugar content rose from 9.5 per cent in 1922 to 13.2 per cent in 1935 and in this year was considerably higher than in Java or Cuba (12.3 and 11.6 per cent respectively). Finally, the table shows that after the peak of production (and area) was reached in 1917-18, production fell, then rose slowly up to 1928-29, fell sharply by almost thirty per cent and then began to rise again.

The explanation of these fluctuations is that the Taiwan sugar industry (and, as a consequence, also the cultivation of sugar cane) passed through several crises of the most severe character. 'Overproduction' is a word familiar to this industry, and to the planters also. Of course, it must be emphasized that this 'overproduction' is of a special character, because the consumption of sugar in Japan is relatively low and, though physically the demand of the population for sugar [61] is not satisfied, there is insufficient purchasing power available to buy it.

All this is very important for the problem in hand. The government's efforts were probably as great from 1900 to 1922 as afterward, subsidies were given more lavishly than later on, but the results in the first twenty years were rather meagre. In other words, the development was due not so much to the government's and the manufacturers' efforts as to some other factors inherent in the development of the economy of Taiwan and Japan."

4:Grajdanzev--67-68 S-4 (no date) 1942 Formosans
116, 248, 433, 656, 177.24 Japan
636.24

"As will be seen, cotton does not occupy an important place in Taiwan's economy. But it does play an important part in Japanese imperial policy. As was mentioned, the Japanese authorities did not spare efforts to encourage the production of sugar cane and rice in Taiwan, not because it was in the interests of the island, but because it benefited Japan proper. Since 1927 the sugar industry has suffered from overproduction and in 1935-36 another spectre appeared on the Japanese horizon--the overproduction of rice. A discussion began as to how the production of rice in Taiwan might be limited. A rice monopoly was suggested and was later applied, but for a somewhat different purpose. Instead of rice, the authorities proposed to encourage the production of textile fibers and oilseeds in Taiwan and, partly owing to the shortage of foreign exchange in time of war, more attention was given to cotton than to anything else. A plan was worked out for the production of 100 million kin of cotton at the end of the ten-year period beginning with 1937, on an area of 100,000 ko, i.e. more than ten per cent of the cultivated area of the island. The first year's crop (according to the Japan Year Book, 1939-40 [68] is estimated at about 6 million kin, or, already six per cent of the goal. We do not know on what the data of the Japan Year Book are based, but in Taiwan Jijo, published in December 1939, the plan provided for an area of only 50,000 ko in 1946 and the production of only 35 million kin. According to the same source, there were 4,800 ko under cotton in 1938 and the crop was 1,816,983 kin--as one may see, very far from 6 million kin. The average yield was 2.26 quintals per hectare--a low figure for a region of intensive agriculture."

4:Grajdanzev--71 S-4 (no date) 1942 Formosans
116, 171, 241, 311, 433, 511, 177.24 Japan
636.24

"It is worth while to observe that in our investigation of agricultural production in Taiwan the figures analyzed were averages, and no question was raised as to whether these averages may be considered representative. The one-sided development of agriculture was emphasized, especially the cultivation of rice and, to a lesser extent, of sugar cane. It is known that one-sided development of agriculture results in soil exhaustion unless sufficient quantities of fertilizers are used, but it was shown that the application of fertilizers is practised on a much smaller scale than in Japan. It was shown also that cultivation is on a low level, yields are low, technique is backward, the draft animal supply is insufficient and per capita consumption of cereals is considerably lower than in Japan.

The expansion of rice production which took place was due chiefly to the increase of the irrigated area and to the increase of acreage from which two crops can be obtained —largely through irrigation and improvement of fields. In the production of sugar cane considerable success has been achieved in increasing the yield and sugar content of the cane. However, in the production of both rice and sugar cane the farmers received a disproportionately small share of the gains."

4:Grajdanzev--85 [2] S-4 (no date) 1942 Formosans
116, 226, 228, 433

"The growth of fishing and of other occupations connected with it, such as the gathering of sea weeds, manufacturing of fish cakes etc., may be seen in the following table [see table on page 86--analyst]."

"In order to see what place industry occupies in the life of Taiwan and what its size is by comparison with Japan, we give below the gross value of production of industry as compared with other branches of Taiwan's economy. We give figures only since 1914 because, as has already been pointed out, data for previous years are of doubtful value. To give but one example, the official sources put the total value of industrial production (1) in 1907 at only ¥273,128; but however primitive this industry may have been it is hardly

1. Sugar and tea industries excluded.

possible that on an island with a population of three millions the gross value of industrial production should be so small.

Thus the value of industrial products increased from ¥45.7 million yen in 1914 to ¥374.9 million in 1937 and at the same time the proportion in industry rose from thirty-four per cent to forty-four per cent of the total. This rise in value is, however, to a considerable degree illusory, reflecting only the rise in prices (the index of wholesale prices in 1937 was almost double that of 1914), but this factor alone could not account for an eight-fold increase. Again, the part of industry, as compared, for example, with agriculture, is exaggerated here because, for farmers, who buy very little from outside, the net value of production approaches seventy and may be as high as eighty per cent of gross value, while in industry the net value, i.e. the value created in industry itself, is

very often only half the gross value of production. This suggests that even now agriculture is responsible for about two-thirds of the [91] total value product. But the fact remains that the value of industrial production has increased greatly, that its part in total production of the island has grown, and that the tendency is for industry's share to grow at the expense of agriculture."

4:Grajdanzev--91 S-4 (no date) 1942 Formosans
116, 433

"Gross Value of Production in Taiwan

million yen

	1914	1919	1921	1929	1933	1935	1936	1937
Agriculture	80.5	252.4	201.3	301.9	237.9	361.0	388.3	403.0
Fishing	3.1	8.9	9.6	21.0	15.9	19.4	21.6	21.4
Forestry	0.6	9.5	10.7	13.9	10.5	12.7	15.1	16.7
Industry	45.7	130.0	130.9	246.8	209.6	264.9	310.0	374.9
Mining	4.5	10.3	10.3	14.8	15.2	22.8	28.7	36.2
Total	134.4	412.0	362.8	598.4	489.1	680.8	763.7	852.2
				Percentages of total				
Agriculture	60.0	61.3	55.5	50.4	48.6	53.0	50.8	47.2
Fishing	2.3	2.2	2.6	3.5	3.3	2.9	2.8	2.5
Forestry	0.4	2.3	3.0	2.3	2.2	1.9	2.0	2.0
Industry	34.0	31.5	36.1	41.3	42.8	38.9	40.6	44.0
Mining	3.3	2.7	2.8	2.5	3.1	3.3	3.8	4.3
Total	100	100	100	100	100	100	100	100

Source: Nogyo nenkan."

116, 171, 433

"Having established the absolute size of industrial production of Taiwan, let us now compare it with gross value of industrial production of Korea and Japan and reduce it to a per capita basis.

This table shows that in 1937 and 1938 per capita industrial production in Taiwan was only one-fourth as large as that of [92] Japan, but was higher than in Korea. If we compare 1929 and 1937 we see that the difference between Taiwan and Japan was smaller in the former year than now, both absolutely and relatively, so that in spite of all talk of the industrialization of Taiwan, the difference between Japan and Taiwan in this respect is increasing. (1)

1. In An Inquiry into National Income of Japan, published by the Research Division of the Japan Economic Federation in 1939, we read on page 90; 'The rates at which production has increased in the Dependencies have been greater than those which have been the case with Japan proper. This fact suggests the youth of industry in the Dependencies.' But, the following comparison shows that the conclusion in the text is correct and that the rates of growth at least in Taiwan are not greater than in Japan proper (based on the absolute figures taken from the Inquiry).

Gross Value of Industrial Production in Japan, Korea and Taiwan, 1929 and 1937 (2)

	Total gross value (million yen)			Per capital [sic] (yen)		
	1929	1937	1938	1929	1937	1938
Taiwan	263.8	360.1	386.4*	58	64	67
Korea	280.5†	927.3	...	14	41	...
Japan	7,716.8	16,412.5	19,667.2	122.5	230	272

Sources: Dainippon teikoku nenkan and Takumu tokei.
*Approximate, because data for machine industry is not abailable.
†1930, no figures are available for earlier dates.

2. These figures for Taiwan differ slightly from those given in the previous table above (taken from Nogyo nenkan), but they are comparable with those of Japan and Korea.

4:Grajdanzev--91-92 S-4 (no date) 1942 Formosans-3
116, 171, 433

Comparison of Rates of Growth
(1930 = 100)

	Industrial production alone	Total production
Japan, 1937	255	229
Taiwan, 1937	194	170 "

"Let us now analyze the composition of Taiwan's industry.

Development of Taiwan's Industry by Branches

Gross value of production (million yen)

	1929	1931	1935	1936	1937	1938
Textiles	3.0	2.1	3.6	4.4	5.0	...
Metals	5.2	4.9	8.8	10.9	12.0	20.9
Machinery	5.3	5.1	6.7	7.7	8.0	...
Ceramics	9.4	6.8	8.8	9.5	8.8	10.0
Chemical	23.1	13.3	27.2	28.5	33.7	39.7
Lumber	8.8	6.5	9.3	10.7	5.5*	6.5
Printing, binding	3.6	3.3	4.4	4.9	5.0	6.8
Foodstuffs	190.1	152.4	212.6	221.5	261.3	251.6†
Others	15.3	10.6	12.1	14.5	20.8	22.2
Total	263.8	205.0	293.5	312.6	360.1*	

* The fall in value of lumber production is probably due to the change in nomenclature. In Kokusei gurafu, May 1940, the value of lumber production for 1937 is given as 11.8 million yen and total production as 374.9 million yen.

† For the sake of comparison 'reclaimed tea' is excluded.

Sources: Dainippon Teikoku nenkan; for 1938, Takunu tokei.

[93] As Percentages of Total

Textile	1.1	1.0	1.2	1.4	1.4
Metal	2.0	2.4	2.9	3.5	3.3
Machinery	2.0	2.5	2.3	2.5	2.2
Ceramics	3.5	3.3	2.9	3.0	2.5
Chemical	8.8	6.5	9.3	9.1	9.4
Lumber	3.4	3.2	3.2	3.4	1.5*
Printing	1.4	1.6	1.5	1.6	1.4
Food	72.1	74.3	72.6	70.9	72.5†
Others	5.7	5.2	4.1	4.6	5.8
Total	100.0	100.0	100.0	100.0	100.0

* The fall in value of lumber production is probably due to the change in nomenclature. In Kokusei gurafu, May 1940, the value of lumber production for 1937 is given as 11.8 million yen and total production as 374.9 million yen

† For the sake of comparison 'reclaimed tea' is excluded.

Sources: Dainippon Teikoku nenkan; for 1938, Takumu tokei."

4:Grajdanzev--93 S-4 (no date) 1942 Formosans

116, 241, 255, 257, 433

"Thus the predominant position in Taiwan's industry—from seventy-one to seventy-four per cent of the total—is occupied by the food industry. The latter consists chiefly of the production of sugar from sugar cane, and, to a lesser degree, of the canning of pineapples. In other words, Taiwan industry is closely connected with its agriculture and is largely the transformation of agricultural products into forms suitable for consumption or for storage and transportation. All other industries show little signs of growth. Ceramics and 'other industries' were at the same level in 1937 as they were in 1929, the lumber, textile, metal and machine industries show an increase, but in absolute amounts this increase is small, and only the chemical industry is of any importance, producing about nine per cent of the gross value."

4:Grajdanzev--93-94 S-4 (no date) 1942 Formosans -1-2
116, 171, 433, 463

"This predominance of the food industry, or, in other words, of the processing of agricultural products, may also be illustrated by the following figures of workers by industries in Taiwan for 1937 covering enterprises with five and more workers, (1) or with a prime-

1. Government enterprises are excluded.

mover. [94]

	Absolute figures	Per cent of total
Textile	3,951	4.5
Metals	2,884	3.3
Machinery	4,214	4.8
Ceramics	10,528	12.1
Chemical	4,988	5.7
Lumber	2,674	3.1
Printing	3,027	3.5
Food industry	48,615	55.7
Other	6,363	7.3
Total	87,244	100.0

Source: Dainippon teikoku nenkan, 1939.

4:Grajdanzev--93-94 S-4 (no date) 1942 Formosans-2
116, 171, 433, 463

"The total number of workers in 1937 was only 87,244, while in Japan in the same year it was 2,936,512, or 34 times as many, though the population of the latter in the same year was only 12.7 times as great as Taiwan's. The number of workers in the food industry made up 55.7 per cent of the total, a smaller proportion than that based on the gross value of production, while the proportion of ceramics in the total was unexpectedly high (12.1 per cent) and that of the chemical industry only 5.7 per cent. The divergence may be explained (1) by special conditions in the industries concerned (e.g. the relation between gross value and net value is different in different industries); (2) by the prominence of modern or of primitive types of industrial enterprises—those in ceramics, printing, bookbinding and the lumber industry, for example, are chiefly small enterprises without machinery where productivity per worker is small; but in the food industry as will be shown later on, and in the chemical industry new and efficient enterprises predominate; (3) by the monopolistic position in the market of certain industries, which permits them to exploit the consumers."

4:Grajdanzev--97 S-4 (no date) 1942 Formosans
116, 257, 377, 433, 473

"Our analysis has shown that in Taiwan only the electric power, chemical, and food industries are large-scale, and that among them the electric power and sugar industries tower far above the rest—in these the corporations would be huge even by the standards of industrially developed nations. We saw that in agriculture Taiwan is an island of contrasts—huge landholdings and poor 'independent' landowners and tenants. The same picture appears in industry and will become clearer on examination of some individual industries for which data are available. We saw that in Taiwan one should distinguish between the progress and prosperity of agriculture in general and of the agriculture of the small Chinese farmers. The same phenomenon appears in industry."

4:Grajdanzev--97-98 S-4 (no date) 1942 Formosans
116. 255. 257. 433

"As was shown above, the food industry occupies a dominant [98] position in the industry of Taiwan. Its composition is as follows: Sugar makes up seventy-seven per cent of the gross value product of the food industry, molasses and candy four per cent, canned pineapples five per cent, and tea five per cent. As will be seen, production of these is concentrated in a few companies.

Gross Value of Production of the Industry,
(1,000 yen)

Sugar	202,240	Fishery products	2,172
Tea	13,452	Soft drinks	1,639
Canned pineapples	12,197	Starch	1,561
Molasses	6,389	Ice	1,496
Flour	6,013	Miso*	789
Candy	5,315	Other foods	5,562
Soya	2,427	Total	261,252"

*Bean paste used as a food.

4:Grajdanzev--98-99 S-4 (no date) 1942 Formosans-1-2
116, 177, 257, 433, 473, 563

"Production of sugar in modern mills is concentrated in the hands of nine Japanese corporations, [99] and of these, six produce ninety-seven per cent of all the sugar produced in modern mills and ninety-five per cent of all that produced in Taiwan. In the table on page 100 information is given concerning each of these six largest corporations. Unfortunately this information is not complete. These corporations are closely connected with many other enterprises in Taiwan and also have enterprises in the Pacific Islands under Japanese mandate, in Java and in other southern colonies (1). Many of these enter-

1. They also have refineries in Japan proper. Sugar produced in Taiwan is not refined there.

prises have nothing to do with sugar. But even so, the information given is interesting because it does throw some light on their activities. The paid-up capital and reserves of three of these corporations is about ¥100 million each. The amount of reserves is explained by the remarkable rate of profit which they receive—34 to 40 per cent is 'normal' for them. A lower rate of profit, as in the case of Ensuiko Seito Corporation (20.2 per cent) may be explained by the fact that the corporation has recently doubled its capital, investing it in new enterprises which do not yet bring profit. Thus the rate of profit in the sugar industry is extraordinarily high for all companies. It was shown above that the farmers did not receive any benefits either from the increase of the sugar

content of the cane, nor from the increase of protection; it now becomes clear that these benefits fell to the manufacturers, for only in this way were these huge profits possible (2).

2. But a certain part of these profits is the result of higher prices paid by the Japanese population for the benefit of these companies, protected by the tariff wall."

4:Grajdanzev--99-101 S-4 (no date) 1942 Formosans
116, 433, 455

"The value of sugar cane produced in the island in 1937 was officially estimated at ¥55 million, while the value of sugar produced in the same year was estimated at ¥202 million.

The high profits led periodically to feverish activity, investments in new and very often highly speculative fields, followed by over-production, a fall of prices, reduction of area under sugar cane, reduction of the price paid for cane and attempts to market the surplus abroad at lower prices, chiefly in the Chinese market. This speculative activity brought on a tremendous financial crisis in 1927 with the collapse of the Suzuki [p. 100 contains a table on sugar corporations; see category 116--analyst] [101] firm, and the speculative activity at the present time, based on expectations of continued war and demand for armaments, may bring even more violent repercussions (1).

1. Toyo keizai, November 9, 1940, reports a sharp fall in production of sugar in 1940-41 and in the profits of the sugar companies."

4:Grajdanzev--100 (no date) 1942 Formosans
116. 257. 433. 473 477

INFORMATION CONCERNING THE SIX LARGEST SUGAR CORPORATIONS OF TAIWAN 1939

	Taiwan Seito	*Dainippon Seito*	*Meiji Seito*	*Fu-ta-i Seito*	*Teikoku Seito*	*Showa Seito*
Established	1901	1896	1908	1908	1910	1927
Paid-up cap. (1,000 yen)	41,080	56,332	45,000	36,938	22,050	11,250
Reserves (1,000 yen)	47,138	23,093	41,500	3,430*	8,081	1,112(1937)
Principal shareholders:	The Emperor of Japan	Toyama-Seimei*	Daichi-Seimei*	Shinei-Sangyo	Yamaguchi	not published
	Mitsui bussan	Meiji-Seimei		Meiji-Seimei†	Nippon-Seimei†	
	Naikoku chokin Bank	Tokyo-Seimei			Meiji-Seimei	
	Mitsubishi-Shanghai	Kaijo-Seimei			Yasuda Bank	
		Nippon-Seimei				
		Yasuda				
Landholdings in Taiwan (ko)	46,630	17,900	13,569	...	3,274	...
Sugar production in 1937/38 (1,000 tons)	236.7	238.6	176.9	150.4	70.6	42.6
Production of molasses, 1936/37 (1,000 tons)	52.4	47.9	33.5	29.5	11.6	...
Other interests	65.7 km. of railways	1,000 km. of railways	118 km. of railways	Alcohol	30 km. of railways	...
	Alcohol	Alcohol	Alcohol	Pulp	Roads	Alcohol
	Refineries in Japan	Etc., etc.	Refineries	Railways	Alcohol	Forestry
	Etc., etc.		Rubber	Agriculture	Etc., etc.	Colonization
			Pulp	Mining		Etc., etc.
			Etc., etc.	Lumber		
				etc., etc.		
Rate of profit (%)	44.65	34.5	40.0	20.2	22.0	20.7
Dividend rate (%)	12	12	12	8	10	10

* Beside its own capital the company report mentions ¥40.6 million of borrowings.
† *Seimei* (life) are life insurance companies.
Sources: 1. *Kabushiki kaisha nenkan*, 1940; 2. *Toyo keizai, Kabushiki kaisha nenkan*, 1939; 3. Kono, R., *Seito kontsuerun*, 1938.

4:Grajdanzev--101 S-4 (no date) 1942 Formosans
116, 433, 458, 477

"All this is mentioned here [see previous paragraphs--analyst] in order to remind readers that the development of Taiwan's sugar industry, as well as of industry in general, was not smooth and uninterrupted, but passed through booms, crises, depressions—phenomena well known from the history of other countries. Taiwan can now produce much more sugar than it actually does produce (as a comparison of figures for 1933 and 1939 indicates), but the small domestic market, combined with a desire to reap high monopoly profits, keeps production far below the level of capacity, while entrance into the international market for the protected Taiwan sugar is not easy. The manufacturers are organized into a cartel which regulates prices and production in order to avoid cut-throat competition and maintain monopoly profits."

116, 278, 387, 433

"With the exception of paper, mineral oil and soap, all the products mentioned here represent the processing of agricultural products or else fertilizers for agriculture. The alcohol is chiefly a by-product of the sugar industry. Formerly all alcohol produced in Taiwan came from molasses, but now part of it is produced directly from sugar cane. The new product—[104]absolute alcohol—is suitable for use as a motor fuel, but no data on its production have been published.

In 1937 the products of this industry were as follows:

	Value (1,000 yen)	Volume (tons)
Mineral oil	1,094	
Soap	941	
Vegetable oils	2,149	3,721 (1936)
Oil cakes	2,382	
Paper	2,165	
Bagasse*	626	
Mixed fertilizers	7,450	67,841 (1936)
Other fertilizers	1,808	
Perfumery and essences	1,211	
Charcoal	1,970	

* Cake for fodder made of the remains from sugar

cane after extraction of the sugar.

	Value (1,000 yen)	Volume (tons)
Refined camphor	1,346	
Alcohol	5,434	
Other products	5,076	
Total	33,652"	

4:Grajdanzev--105 S-4 (no date) 1942 Formosans
116, 28, 433

"This group is made up of following gross values of Products for 1937: (1,000 yen)

Gold and silver paper	630	Needlework	2,360
Bamboo products	1,992	Hats	2,705
Straw goods	663	Other goods	5,209
Leather goods	1,576	Total	15,906 "
Sisal and hemp products	771		

4:Grajdanzev--107-108 S-4 (no date) 1942 Formosans-1-2
116, 316, 433

"The relative importance of mining products produced in 1936 may be seen in the following table:

Metals or minerals	Value of output (1,000 yen)	Per cent of total	Volume
Gold	4,224	14.7	
Gold-silver-copper ores	5,881	20.5	
Placer gold	160	0.6	
Gold ores	2,078	7.2	
Total gold and gold ores	12,343	43.0	41,608 oz. (1936)
			50,000 (1937)*
Silver	17	0.1	
Copper	470	1.6	2,299 tons (1934)
			4,000 (1936)*
Coal	11,365	39.6	1,744,000 (1937)
Sulphur	87	0.3	1,071 tons (1935)
Phosphorites	1	—	
Petroleum	312	1.1	1,780 thous. gall. (1935)

* Approximate figures

4:Grajdanzev--106-107 S-4 (no date) 1942 Formosans
116, 316, 433, 454, 177.31 Japan
636.31

"Mining occupies a relatively unimportant position in Taiwan. In 1936, the last year for which data are available, the gross value of mineral products was Y28,727,000, less than ten per cent of the value of industrial production and less than one per cent of total production. But as regards the capital invested, the attention given by the government to oil and, recently, to gold, and the subsidies lavished on actual and potential producers of oil, it occupies quite a prominent position. The caiptal of the mining industry at the end of 1937 was Y46,635,000 (1). There were twenty-four companies, [107] but, just

1. It is not clear whether this is subscribed or paid-up capital, or whether this sum includes reserves and other investments.

as in other fields, three companies dominated the field; Taiyo Kogyo, Taiwan Kogyo, and Keelung Tanko (coal), (2) each having capital of over Y5,000,000.

2. The paid-up capital of this corporation is Y7 million and out of 140,000 shares 43,473 are in the hands of Mitsui Kosan and 41,656 in the hands of Mitsui Bussan."

4:Grajdanzev--85 S-4 (no date) 1942 Formosans
116, 221, 226, 433, 471, 177.22 Japan
636.22

"Fishing, which did not demand an elaborate equipment, was an important auxiliary occupation for the Chinese farmers, especially in slack seasons. The sea around Taiwan is rich in fish and the Chinese are expert fishermen. It is natural, then, that fishing has become an important element in the economy of the coastal farmers. But at the time of their conquest of Taiwan the Japanese were not interested in the fisheries because at that time the seas around Japan proper and near Kamchatka had not been sufficiently utilized. Petty regulations, the taxing of fishermen, and other measures brought a decline in this ancient Chinese occupation and only recently, when the Japanese felt a need for more fisheries, and when their huge corporations with their mechanized equipment turned to the South, did the government become interested in fishing. The results were the same as in all other spheres of the economic life of Taiwan: Japanese fishing grew at the expense of Chinese."

Metals or minerals	Value of output (1,000 yen)	Per cent of total	Volume
Natural gasoline	456	1.6	1,480 thous. gall. (1935)
Carbon black	292	1.0	1,237 tons (1935)
Others	3,384	11.7	
Total	28,727	100.0	

As shown in this table, gold and coal make up about eighty-three per cent of the total value, and are thus of paramount importance. No explanation is available of the group 'others', [108] representing 11.7 per cent of the total. In 1935 this group made up only about four per cent and the sudden leap to 11.7 per cent is difficult to explain."

4:Grajdanzev--108-109 S-4 (no date) 1942 Formosans -1-2
116, 316, 433, 439

"Actual production of coal reached its maximum in 1927, when 1,850,000 tons were produced. After that a decline set in, the lowest point occurring in 1932 (1,355,000 tons). With the general revival, production rose to 1,550,000 tons in 1935 and in 1937 to 1,744,000 tons. However, the low development of industry and the poverty of the population combine to [109] make the marketing problem difficult. Production capacity is considerably larger than actual production, and as may be seen from the following table, the market for coal is chiefly outside Taiwan.

Consumers of Taiwan's Coal 1932-34

	Quantity (1,000 tons)	% of total
Industry	399.7	27.6
Railways	150.5	10.4
Homes	48.8	3.4
Shipping	498.8	34.4
Exports	330.0	22.8
Other	21.3	1.4
Total	1,449.1	100.0

Source: Taiwan ginko chosa kacho, quoted by K. Takahashi.

Thus only slightly more than forty per cent of the output is consumed in the island

itself. Taiwan is capable of producing more coal than it does now, but the limiting factor is the smallness of the domestic market."

4:Grajdanzev--149 [21 S-4 (no date) 1942 Formosans
116, 433, 439, 177.24 Japan
636.24

"In 1939 about 81 percent of Taiwan's exports consisted of agricultural raw materials and products manufactured from them such as sugar, tea, and tobacco. In fact the island is practically an agricultural appendage of the Japanese economy."

10: Schumacher--225 [11] T-1 (ca. 1896) 1898 Formosans 116, 433

An English company offered the Japanese only 16 million Mark for the camphor monopoly exclusive of the high export duties; in reality the export value of the camphor forests, according to findings of the Chinese custom authorities, amounts to an export value of 1, 200, 000 Mark annually or represents a capital value of 25 million Mark.

15: U.S. Navy--27 [9] (no date) 1944 Formosans
116, 241, 433, 434, 177.43 Japanese
636.43

"Food is plentiful, but is subject to requisition by the Army. The farming population is able to raise a substantial amount of the food it consumes, but the Japanese frequently order the restriction of plots planted to these crops in order that more space may be devoted to a crop (castor oil beans for instance) required by the military. In 1940 the official daily ration of rice permitted to farmers in Taihoku Province was only 0.60-0.75 pounds, or 2-2.1/2 go per person. This is well below the usual consumption and has been the cause of bitter discontent and resistance."

42: Schetelig--392-393 T-2 (no date) 1868 Formosans
116, 135, 314, 433

Among the products of the country I mention those of special interest for Europeans; coal, camphor and sulphur, for indigo and hemp are sent to the Chinese market only. No great quantities of sulphur are found, but more could be obtained nevertheless by the improvement of the methods used. Camphor alone makes a treasure chamber of the island of Formosa. It is known that the Laurus camphora is found only in Japan and Formosa, and there only in some districts. Since only trees of a particular age can be used for obtaining the valuable resin, and since every time, unfortunately, the whole tree with trunk and branches is thrown into the subliming pot, one can foresee a time when camphor will go up in price in geometric progression [393] and when finally production will become so small that not even Germany alone can be provided with it. This matter of camphor production seems to me to be of no means inconsiderable economic importance...

186 642 of local affairs, since governments on the local level as provided by the Chinese Constitution exercise only those powers delegated to them by the central government. There is also the complaint, though not necessarily substantiated by fact, that the "elected Formosans often held office in name only and that Kuomintang men appointed under them held the real power."[15] To remedy such complaints and to make the Formosans more enthusiastic about self-government, two measures may be desirable: (a) extension of the powers of the Provincial Assembly, and (b) selection of personnel for top provincial posts, including that of the governor, by popular suffrage.

642 433 To gain more support from Formosans, the Nationalist government must also seek to improve further their economic well-being. Although the general industrial level has risen forty per cent above the Japanese peak year of 1941, neither in agriculture nor in industry have the gains kept pace with the increasing population. The per capita production is still below that of the Japanese period. Moreover, the rising cost of living has made the economic life of the island unstable. With American aid, the Nationalist Government has been trying to step up the industrial production of the island, but the prospect of arresting inflation is not very bright.

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15. Preston Schoyer, "Present Conditions on the Island," The Reporter, Vol. 12, March 10, 1955, p. 18.

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433 For the main cause of inflation is the huge deficit in the national budget, which is strainted by nearly one million men in the armed forces.

701 The upkeep of such a huge military force accounts for the most crucial question raised by political observers: are the Formosan people willingly supporting the military program of the government? Contrary to speculation, the answer is affirmative. Foreign visitors are practically unanimous in stating the lack of interest among the Formosans in the liberation of the Mainland. This is true although such sentiment has not been openly expressed as the result of the rigid government control of all media of public expression. Nevertheless, another facet of the question, the need of a strong military force to defend the island, has never been debated. The farmer in Formosa now owns the land he cultivates, however small the acreage, and enjoys the fruits of his own labor. He certainly does not cherish the propsect of being chained to a collective farm, and laboring under the whip of political cadres. The industrial developments of recent years have provided opportunities for an increasing number of people and given rise to a new business and industrial class. The Formosans are both resourceful and industrious. They will be loath to see their prosperous land overrun by Communism, suffer deprivations similar to those found on the Mainland. It is quite certain that Formosans will resist Communist aggression, and that they will defend the offshore islands too. The best evidence of the unequivocal support of the Formosans to the government is the response of young Formosans

45:Stanford U. S-4, 5 1956 AD1 Formosa
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648 Under the Japanese from 1895 to 1945, the economy of Formosa was geared entirely to that of the colonial power. The island was developed as a major source of foodstuffs to feed the rapidly growing population of Japan. All possible arable land was brought under cultivation. The production of rice [433] more than doubled between 1905 and 1935; the sugar crop tripled between 1910 and 1940.[4] Great strides were made in modernizing communications and transportation throughout the island, including the construction of a network of railways and roads. After 1937, 648 178 439 some effort was directed toward the industrialization of the island. Factories were built, electric power developed, highways and railways improved, and harbors enlarged. A number of large plants were established to use the raw materials of Southeast Asia in the production of semi-finished goods to supply Japanese industry. The chief emphasis was on metals and chemicals. No attempt was made to achieve industrial self-sufficiency on the island. Fertilizer and textiles, two of the most important industrial products in an agrarian economy were totally neglected.

4. Norton S. Ginsburg, Economic Resources and Development of Formosa, New York, Institute of Pacific Relations, 1953, p. 24.

or severely damaged by Allied bombing during World War II. Further depreciation and deterioration of Japanese installations were caused during and immediately after the war by typhoons and floods coupled with lack of maintenance and repair. Even the railway system, the principal means of freight and passenger transportation, was capable of handling only a fraction of the freight and passenger demand. "Rails were worn thin, one-third of the cross ties were rotten, rolling stock was seriously depleted or in need of complete overhaul."[7] The war and the repatriation of Japanese nationals afterward also caused disruption of rural services in credit collection, processing, and marketing of farm produce. Due to a scarcity of imported fertilizers, production of the two principal cash crops, sugar and rice, dwindled considerably. The production of rice fell from 1,100,000 metric tons in 1943 to 600,000 metric tons in 1945 and sugar production dropped from 1,022,000 metric tons in 1942-43

7. "Economic Progress on Formosa" Chinese-American Economic Co-operation, pub. by Mutual Security Agency Mission to China, Taipei, Vol. 1, No. 2., Feb. 1952, p. 12.

45:Stanford U. S-4, 51956 AD1 Formosa
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727 to 86,000 metric tons in 1945-46. The
433 Formosan farmer was faced with the "worst prospect in living memory," as one observer remarked.[8]

434 In spite of the seriousness of economic
178 conditions on Formosa, the Chinese government was able to make only limited progress in reconstruction following the restoration of the island to Chinese control. For one thing, the Nationalist Government was involved in a costly war with the Communists and faced with a huge rehabilitation program on the Mainland. Furthermore, without a surplus of exportable goods, China could not obtain the foreign exchange necessary to re-equip the damaged plants and restore agricultural production on Formosa. The island's economy continued to deteriorate until 1949, when Mainland China was overrun by the Communists and the National Government was withdrawn to Formosa.

458 The sudden influx of over one million
185 mainlanders and half a million soldiers further strained the resources of the island. Inflation was running wild and food was short. However, the removal of the national government to Formosa was not without benefit to the island.

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8. H. Maclear Bates, Report from Formosa, New York, Dutton, 1952, p. 117.

648 improved crop seeds and animal breeds, and large quantities of insecticides for the control of crop diseases. Help has also been given in expanding and improving irrigation and flood control systems and in promoting soil conservation and reforestation. Through the establishment of health stations and improvement of hospital facilities, JCRR assists government agencies in eradicating malaria, controlling tuberculosis, and improving rural health in general.[11] The practical benefits of JCRR activities to the farm households are widespread and evident, and the above-mentioned improvements have been accomplished with relatively little money.

648 433 With American aid, substantial progress in economic reconstruction has been achieved in the past five years. Industrial production at the end of 1954 exceeded the peak production under the Japanese by 50 per cent.[12] Electric power has been doubled. Textiles, which were practically non-existent before the war, are now actually overproduced. Rice production in Formosa has been increased

11. Chinese American Joint Commission on Rural Reconstruction, General Report IV, Taipei, 1954, p. 3.

12. For details, see chapter on Industry.

both in yield per acre and in total amount, so there is at present not only a sufficient supply to feed the increased population, but also a substantial amount for export.

United States aid appropriations for China from 1951 to 1954 was as follows:

1951	US$ 98,034,000
1952	81,479,000
1953	105,503,000
1954	111,821,000
	US$ 396,837,000

In fiscal year 1955, the allotment totaled US$102,000,000, distributed among the following programs:[13]

Military program	US$ 37,000,000
Commodity aid	34,000,000
Industrial construction	28,000,000
Technical assistance	3,000,000
	US$ 102,000,000

From the disorganized and demoralized condition of Formosa in 1949, the joint Chinese

13. As reported by Martin Wong, Secretary-general of the Council for U.S. Aid on Aug. 12, 1955.

178 and American efforts have effected tremendous
648 change. However, in spite of steady gains,
433 the economy of Formosa has not achieved
• complete stability. Industrial and agricultural production is higher than before the war, but because of the tremendous increase in population, per capita production is still below the pre-war level. The Nationalist Government has been able to meet yearly budgetary deficits only by relying on American aid and resorting to the printing press. Forty per cent of the annual imports into Formosa are financed by United States aid. Inflation is steadily mounting. The economic situation would be very grave without United States assiatance.

185 On the avowed basis that "a nation's
433 progress and prosperity cannot be a gift from others, but must be sought through production and reconstruction,"[14] the Nationalist Government formulated a four-year plan for economic reconstruction in 1953. The plan aims at developing the island's economy production to a self-sufficient level. By the time the plan is fully implemented, the government intends that Formosa, without

14. Report of Premier Chen Cheng (now Vice-President) before the National Assembly, March 4, 1954.

185 foreign aid, will be able to provide its people
433 with the goods and services necessary for a satisfactory standard of living and yield sufficient revenue to support needed public services, including defense. The general co-ordination and review of the plan is the responsibility of the Economic Stabilization Board (ESB), established in July 1, 1953 within the Executive Yuan.

The Four-Year Economic Development Plan, is divided into two parts -- agricultural and industrial. The agricultural plan is directed at increasing the production of rice, sugar, pineapple, tea, peanuts, and soybean as a means of increasing exports and reducing imports. Since agriculture in Formosa is comparatively well developed,[15] the aim of the Four-Year Plan is to expand farm production 20 per cent by 1957.

The major emphasis of the Four-Year Plan is on industrial development, and top priority is given to the production of power and fertilizer. The following goals have been announced[16] for expanding the output of major products on completion of the plan in 1956 (production in 1952 equals 100):

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15. Practically all arable land is now in use. The possibility of enlarging the cultivated area depends largely on expanded irrigation.

16. Industrial Development Commission of the Economic Stabilization Board, The Four-year Economic Development Plan, Taiwan, Taipei, 1955, pp. 4, 7.

45;Stanford U. S-4, 5 1956 AD1 Formosa
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Item	1956 Index	Item	1956 Index
Rice	118	Coal	131
Sugar, white	138	Canned pineapple	217
Sugar, brown	181	Flour	2,060
Wheat	126	Cotton yarn	171
Peanuts, unhulled	150	Cotton cloth	122
Soybean	187	Paper	162
Tea	122	Soda ash	1,830
Pineapple	129	Phosphate	159
Fish	139	Cement	141
Timber	124	Shipbuilding	436
Poultry	122	Power	174

45:Stanford U. S-4, 5 1956 AD1 Formosa
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433 According to the report of the Industrial Development Commission of the Economic Stabilization Board, "annual production goals as set out in the Plan have generally been realized. In some instances, such as canned pineapple and textile production, actual production has been greater than planned."[17] A new Four-Year Plan is beingdrawn up to cover the period 1947-1960. These development plans indicate the determination of the Chinese government to put the economy of Formosa on a more solid basis. At the end of these two four-year plans the government envisions that, despite the heavy strain of military requirements, the national budget will be balanced; inflation will be halted; there will be enough export to balance foreign exchange payments; and the economic development will be great enough to take care of the rapidly growing population.

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17. Ibid., p. 8.

423 The benefits of the rent-reduction program
427 are noticeable in the improvement of the
511 tenant farmers' living conditions. The saving in rent payments, amounting 25-30 per cent of their gross income, can now be used to buy new clothing for their families, to send their children to school, to repair their houses, or to purchase farm land. They also work harder
423 because any inc reace in production accrues to
433 them. This factor contributed to the substantial annual increase of rice production from 1949 to 1954.

Production of Unhulled Rice*

Year	Metric Tons
1949	1,215,000
1950	1,421,000
1951	1,485,000
1952	1,570,000
1953	1,642,000
1954	1,695,000

* Taiwan Economic Data Book, compiled by FAO Mission to China, Part II, Vol. III, March 1955, Taipei, p. 5. The average production of rice perhectare increased from 1,624 kilograms in 1949 to 2,183 kilograms in 1954. Central Daily News, Oct. 22, 1955, p. 3.

45;Stanford U; S-4, 5 1956 ADI Formosa
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Table 1. Crop Production, 1902-1939*

	Arable Land (1,000 ko)	Rice (1,000 koku)	Sugar Cane (million kin)	Sweet Potatoes (million kin)
1902	451	2,821	1.1	501
1925	780	6,443	8.8	1,909
1939	886	9,152	21.4	2,132

* Taiwan keizai nenpo, 1941 [Taiwan Economic Annual, 1941], Tokyo, Taiwan keizai nenpo kankohai, 1941, Appendix. One ko = one chia; one ko = 0.961 hectare. Koku is a Japanese measure of volume. One koku of brown rice weighs approximately 188 kilograms. One kin (Taiwan catty) = 1.31 pounds, or 0.597 kilogram.

45:Stanford U. S-4, 5 1956 AD1 Formosa
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II. ARABLE LAND

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The amount of arable land available for agricultural production was more than doubled during the period of Japanese rule. With improved production techniques and methods of irrigation, there was a twentyfold increase in sugar cane, a fourfold increase in sweet potatoes, and a threefold increase in rice production. The production of pineapple increased over a hundred times.

By 1936, Japan turned its efforts toward the development of industry on Formosa. This was due, in part, to wartime needs as well as to the fact that the development of available arable land had reached its limit. Yet agricultural production under the Japanese set a record that required more than five years' effort after World War II to surpass.

Today, it is generally believed that Formosa has exhausted the possibilities of its arable land. However, if better fertilizer, improved seed, new farming techniques, and adequate pest control are introduced, it

[433] 311 would seem possible for the island to produce more food to meet the needs of an increasing population. It is also possible that irrigation projects, now in the planning stage or but recently begun, may increase the amount of irrigated land available.

Table 2. Cultivated Land*
(1,000 hectares)

	Paddy Fields	Others	Total
1945	504.7	311.3	816.0
1949	528.1	336.8	864.9
1953	533.3	339.4	872.7

* Taiwan Provincial Government, Taiwan Agricultural Yearbook, 1954, Taipei, 1954, p. 20.

Steep and rugged mountains cover the major portion of Formosa. The island's total land area has been estimated at 3,596,000 hectares, of which only 24 per cent is considered suitable for agricultural purposes. For the past eighteen years, the

241 rice, one or two crops of sweet potatoes, peanuts, wheat, or flax are planted, the number depending upon the time necessary for the harvest. The fertility of the soil is heavily taxed by the practice of multiple-cropping, and the intensive use of fertilizer is necessary. Ch'en Cheng-hsiang places the index of multiple-cropping at about 160 per cent -- the ratio of crop area to cultivated area.[6]

III. FARM PRODUCTIVITY

241 433 The productivity of Formosan farmland seems to depend upon the intensity of cultivation. It has been reported that the average yield per chia of both first and second

6. Ch'en Cheng-hsiang, T'ai-wan T'u-ti Li-yung [Land Utilization in Taiwan], Taipei, National Taiwan University and Joint Commission on Rural Reconstruction, 1950, pp. 95-96. The per cent quoted is an average for the period 1938-42. The index may be slightly higher in recent years as the land is utilized to greater advantage and the practice of multiple-cropping is used to increase production.

45: Stanford U. S-4, 5 1956 AD1 Formosa AD1

(Table 3 faces p. 536.)

Table 3. Selected Crops - Yield Per Hectare*
(in kilograms)

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	Prewar Peak Years	1945	1949	1950	1951	1952	1953	1954
Rice	2,242 (1938)	1,273	1,624	1,845	1,882	1,998	2,109	2,183
Sweet Potatoes	12,734 (1937)	8,650	9,172	9,443	8,737	8,953	9,576	10,459
Sugar Cane	78,860 (1939)	38,628	50,606	48,064	45,237	49,003	74,136	
Wheat	628 (1941)	296	720	1,042	1,058	1,139	1,058	1,403
Crude Tea	375 (1917)	61	283	279	294	305	305	291
Soybean	520 (1922)	264	594	618	577	602	617	683
Jute	667 (1939)	326	797	766	894	1,242	787	

* Taiwan Agricultural Yearbook 1954, Taipei, 1954, pp. 1-81. Yields for the prewar peak years are calculated by the author from the same source. The 1954 figure are from China News Press, China Annual 1954, Taipei, 1954, Vol. 3, pp. 6-7.

(facing p. 536)

241 rice crops tends to decrease as the size of
433 the farm increases.[7] The smaller the farm, the more intensive the cultivation, the higher the yield. Productivity also varies according to the fertility of the land and the efficiency of the cultivation.

241 As a rule, farmers on the island do not regard farming as a source of profit but as a means of insuring the subsistence of their families.[8] Those who make their livelihood by growing rice will continue to grow rice even when other crops seem to offer a greater margin of profit. To them, rice is their sole security, and they use rice to pay their taxes, to barter for other commodities, and to feed their families. Rice becomes "money in the bank."

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7. The chia is a local measure of land area = 2.4 acres.

8. Bank of Taiwan, Economic Research Department, T'ai-wan Yin-hang Chi-k'an [Bank of Taiwan Quarterly], Vol. 5, No. 4, March 1953, Taipei, pp. 1-27.

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The yield per unit area of various crops has been increasing steadily since 1945. However, the highest yields in the postwar years are lower than the highest yields in the prewar period. Any number of reasons has been advanced to explain this failure to regain prewar productivity. Less chemical fertilizer is available at present. Lack of funds has postponed extensive development of arable land. The percentage of spoilage each year is high because storage facilities are inadequate Serious losses have been caused by insects and blight. When these problems are solved, according to the Joint Commission on Rural Reconstruction, the yield per hectare can be increased, as follows:

	Feasible Goals (kg./hectare)
Rice	2,500
Sweet Potatoes	13,000
Peanuts	1,000
Sugar	10,000
Crude Tea	500
Bananas	12,000
Pineapples	14,000

These goals represents increases in per hectare yield of amount varying between 10 and 50 per cent of highest yields achieved in

241 433 the postwar years. These goals can be attained without the expansion of present planted acreage and are more optimistic than the goals contemplated for 1956 in the Formosan Four-Year Plan.[9]

If the per unit yield can be increased and additional land is made productive, there is no reason why Formosa cannot substantially expand its yearly production. Rice is now planted on approximately 780,000 hectares of land; upon the completion of Shihmen dam and reservoir, it will be possible to grow rice on 835,000 hectares. If the yield per hectare is 2,500 kilograms, the total yield will be 2,100,000 metric tons, enough to feed 14 million people.[10]

IV. FARM MECHANIZATION

241 407 As in most undeveloped countries, agriculture in Formosa is conducted on a primitive basis. The average farmer has only

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9. The Four-Year Plan, begun in 1952, is designed to bring about the economic independence of Formosa by increased production in agriculture and industry.

10. The Central Daily News, July 1, 1955.

(continued next page)

241 his strong back and a few simple implements.
407 If he is fortunate, he owns a water buffalo. The Taiwan Sugar Corporation owns 500 tractors, but this is the only large-scale use of farm machinery on the island. Mechanization would help to increase farm yields, but many difficulties are presented by the small size of the fields and the many natural obstacles to any plan which calls for the co-operative use of farm machinery. Moreover, private ownership of tractors or other modern farm implements is prohibitively expensive, and the farmer has no experience in repair and maintenance of such machines. On the other hand, water buffaloes are of value to the farmer as a source of fertilizer, meat, and hides.[11] Additional study is necessary to determine whether extensive mechanization of agriculture would be economical for Formosa.

V. DOMESTIC CONSUMPTION

241 438 Formosa, as a rule, has produced sufficient agricultural products to meet the

10. (continued) The Shihmen dam and reservoir will increase the irrigated land in Formosa by approximately 55,000 hectares.

11. Norton S. Ginsburg, Economic Resources and Development of Formosa, New York, Institute of Pacific Relations, 1953, p. 38.

241 433 demands of domestic consumption. Surplus rice is exported each year, and the supply of vegetables is considered adequate. Meat is expensive, and the ability to buy meat E262 determines socio-economic position in Formosan society. Data on dietary habits, 146 433 caloric requirements, and so forth are not available, probably because extensive surveys have never been conducted on the island. There is no way of ascertaining basic food requirements to maintain a desirable nutritional level.

433 The Provincial Food Bureau has estimated the per capita rice requirement for civilians to be 143.4 kilograms, and for the military, 308 kilograms. (These figures do not provide for surplus storage, waste, spoilage, or seeds.) Rice requirements for the next ten years may be estimated as indicated in Table 4. Note that the size of the military force on Formosa is assumed to remain constant (600,000).

45:Stanford U. S-4, 5 1956 AD1 Formosa
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Table 4. Rice Requirements for 1955-56*
(in 1,000 metric tons)

Year	Estimated Population (1,000)	Civilian Rice Requirements	Military Rice Requirements	Total Requirements
1955	10,400	1,405.3	184.8	1,590.1
1956	10,712	1,450.1	184.8	1,634.9
1957	11,033	1,496.1	184.8	1,680.9
1958	11,364	1,543.6	184.8	1,728.4
1959	11,705	1,592.4	184.8	1,777.2
1960	12,056	1,642.8	184.8	1,827.6
1961	12,418	1,694.7	184.8	1,879.5
1962	12,790	1,748.1	184.8	1,932.9
1963	13,174	1,803.1	184.8	1,987.9
1964	13,569	1,859.8	184.8	2,034.6
1965	13,976	1,918.2	184.8	2,103.0

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* The estimated population for 1955 is based on the study of population in this handbook. Population for subsequent years is calculated on the assumption that annual increase will be approximately 3 per cent.

The civilian population is each year's population minus a constant armed forces of 600,000 men. Per capita rice consumption is assumed to be 143.4 kg. a year. Military per capita rice consumption is 308 kg. a year. These per capita estimates are based on statistics furnished by the Provincial Food Bureau.

45;Stanford U. S-4, 5 1956 AD1 Formosa
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433 Since Formosa produces as much as 1,700,000 metric tons of rice each year, there is no reason why the island cannot maintain its present surplus until 1958, provided that nothing affects productivity. After 1958, there will be a shortage of rice, unless productivity is increased. If per hectare yield should be increased to 2,500 kilograms per year, and planted acreage expanded to 835,000 hectares, as has been projected in the Four-Year Plan, Formosa's annual rice supply will be sufficient for domestic consumption until 1965.

VI. MAJOR CROPS

434 The most important food crops produced on Formosa are rice and sweet potatoes. These two crops in 1953 accounted for approximately 60 per cent of total production (rice, 52.8 per cent; sweet potatoes, 7.2 per cent). Of special crops, sugar cane accounted for 13 per cent, vegetables, 3.2 per cent, peanuts, 1.8 per cent, crude tea, 1.5 per cent, tobacco, 1.2 per cent; and bananas, 0.8 per cent.[12]

12. Taiwan Agricultural Yearbook 1954, Taipei, 1954, pp. 30-31.

45:Stanford U. S-4, 5 1956 AD1 Formosa
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The raising of hogs is Formosa's third most profitable endeavor, only surpassed by the annual crops of rice and sugar cane. Pork and fish are the major sources of protein in the diet of the islanders. The annual production of various agricultural produce is presented in Tables 5, 6 7, and 8.

45:Stanford U. S-4, 5 1956 AD1 Formosa
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Table 5. Food Production*
(in 1,000 metric tons)

	Rice	Sweet Potatoes	Soybeans	Peanuts	Wheat
1937	1,319	1,770	6	32	1
1938	1,402	1,726	6	28	1
1939	1,307	1,279	4	28	6
1940	1,129	1,512	3	29	4
1941	1,199	1,693	3	22	7
1942	1,171	1,556	3	13	6
1943	1,126	1,406	3	10	2
1944	1,068	1,521	5	12	2
1945	639	1,165	2	12	1
1946	894	1,331	4	37	1
1947	999	1,783	10	47	4
1948	1,068	2,003	12	53	6
1949	1,215	2,166	12	53	10
1950	1,421	2,201	13	57	19
1951	1,485	2,021	13	61	15

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1952	1,570	2,090	15	60	17
1953	1,642	2,277	17	60	14
1954	1,695	2,324	17	67	15
1955	1,633	2,290	24	70	19

* Data for the years 1937-53, from Foreign Operations Administration Mission to China, Taiwan Economic Data Book, Part II, Volume III, Taipei, 1955; for 1954, from Industrial Development Commission, Industry of Free China, Vol. 3, No. 4, April 1955, Taipei; for 1955 from the Central Daily News, February 3, 1956.

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Table 6. Commercial Production*

	Sugar Cane	Tea	Citronella	Jute
	(in 1,000 metric tons)			
1937	8,563	13	-#	9
1938	9,061	13	-*	14
1939	12,822	14	-*	15
1940	9,977	12	273	11
1941	8,392	12	174	7
1942	10,250	12	319	11
1943	10,092	8	201	7
1944	8,468	4	35	4
1945	4,159	1	29	2
1946	1,007	3	12	1
1947	796	7	61	3
1948	3,116	8	213	11
1949	6,194	10	380	9
1950	5,861	10	762	7
1951	3,585	10	1,274	11

45;Stanford U. S-4, 5 1956 AD1 Formosa
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1952	4,801	12	2,561	20
1953	8,394	12	2,527	5
1954	6,130	13	-	12
1955	-	14	-	19

* Data for 1937-53, Taiwan Economic Data Book, Part II, Volume III; for 1954, Industry of Free China, Vol. III, No. 4, March 1955; for 1955, the Central Daily News, February 3, 1956.

\# February 3, 1956 not available.

45:Stanford U. S-4, 5 1956 AD1 Formosa
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Table 7. Production of Fruit*

	Pineapple	Banana	Citrus
	(in 1,000 metric tons)		
1937	108	219	33
1938	116	202	36
1939	146	182	35
1940	129	169	32
1941	130	191	39
1942	116	196	34
1943	94	142	29
1944	43	65	21
1945	18	32	17
1946	17	53	20
1947	40	124	25
1948	39	110	28
1949	43	98	27
1950	46	117	28
1951	52	100	27

45:Stanford U. S-4, 5 1956 AD1 Formosa
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1952	63	107	28
1953	68	96	29
1954	62	109	31
1955	64	90	33

* Data for 1937-53, from Taiwan Economic Data Book, Part II, Volume III; for 1954, from Industry of Free China, Vol. III, No. 4 April 1955; for 1955 from the Central Daily News, February 3, 1956.

45: Stanford U. S-4, 5 1956 AD1 Formosa AD1

(Table 8 follows p. 550.)

Table 8. Production of Livestock*
(in 1,000)

	Hogs	Cattle	Chickens	Ducks
1937	1,849	358	7,073	1,958
1938	1,827	325	7,095	2,023
1939	1,653	325	6,680	1,931
1940	1,205	300	-0	-
1941	1,158	309	-	-
1942	1,358	312	-	-
1943	1,257	325	4,548	1,896
1944	862	331	3,837	1,358
1945	578	291	3,998	1,136
1946	768	280	4,555	1,647
1947	1,006	298	5,199	2,247
1948	1,167	310	4,525	1,985
1949	1,362	357	4,989	2,217
1950	1,620	365	5,143	2,547
1951	2,262	378	5,389	2,991
1952	2,611	383	5,595	2,912
1953	2,820	390	6,388	3,389

* Data on hogs and cattles are from Taiwan Economic Data Bank, Part II, Vol. III, on chickens and ducks 1937-39, from Taiwan hsien-sheng 1948 [Taiwan Economic Annual 1948]; for 1949-53, from Taiwan Agricultural Yearbooks.

0 Not available.

[table 8 follows p. 550]

A. Production of Rice

433 The production of rice has increased steadily in the postwar years; production in 1950 exceeded the 1938 production level peak achieved by the Japanese. However, because relatively less fertilizer is available for use, the per hectare yield of Formosan fields has not reached the record yield of 2,242 kilograms achieved under Japanese rule. Rice exports have been sacrificed to meet the domestic requirements of the swelling population of the island. In 1938, nearly 50 per cent of the 1.4 million metric tons of rice produced was exported; in 1954, only 36,000 metric tons of rice were available for export in spite of the fact that nearly 1.7 million metric tons were produced in that year. Such a drastic decrease in rice export has affected the dollar reserves of the Formosan people and made it difficult for the country to import the industrial goods necessary for continued economic development.[13]

243 Rice and sugar cane, the two most 249 valuable crops, compete for use of land

13. Industrial Development Commission, Industry of Free China, Vol. 3, No. 6, June 1955, p. 80 .

C. Production of Sugar Cane

249 Sugar cane is the raw material for
648 Formosa's sugar industry. Postwar increase
433 in production is all the more remarkable since in the years before the war the Japanese did all they could to exploit the potentialities of sugar cane production to meet the sugar requirements of Japan proper.

Sugar cane is usually planted in the summe June to September. About a year and a half are required before the cane is ready for harvest. Under the International Sugar Agreement concluded in London in 1953, Formosa is permitted to export 600,000 metric tons of sugar annually. Government policy has been adapted to meet this quota and allow for domestic consumption. Land once used for sugar cane is now being used to produce other products.

D. Production of Wheat

243 Wheat produced on Formosa accounts
433 for less than one per cent of the total value of the island's farm production. For this reason it has been generally believed that Formosa lacks the conditions suitable for

45:Stanford U. S-4, 5 1956 AD1 Formosa
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optimum wheat production. Postwar research has proved that wheat can be grown between rice crops in the regions centering on Taichung, Changhua, and Tainan, and the amount of land given to wheat production has been increasing gradually.

E. Production of Tea

About 90 per cent of the tea produced on Formosa is exported to American and European markets. The production of tea and its planted acreage has been more or less constant since 1880. Commercial growing of tea began about 1865, and there are three major groups -- Paochung, Oolong, and black -- which are most successfully grown on the island.

VII. FORESTRY

Forests cover about 64 per cent of the total area of Formosa because abundant rainfall is favorable to the growth of trees. The island's forests furnish all domestic lumber and prevent erosion in mountainous areas. Forestry products accounted for approximately three per cent of the total value of all goods produced in 1953. The total timber reserve, as of 1954, was estimated

313 at approximately 202,258,000 cubic meters.[14]
433 Broadleaved trees account for about 65 per cent of this reserve; the remainder is made up of coniferous trees. Only 4.3 per cent of the reserve is privately owned; about 90 per cent is owned by the government, which maintains complete control of the island's forestry. It is estimated that about 1,000,000 cubic meters of timber may be cut annually without impairing the total reserve. Production of timber in 1953 was estimated at 515,000 cubic meters; in 1954, at 546,000 cubic meters. Government policy has been to cut less than 50 per cent of available timber, and the government's reforestation program assures that an area equivalent to the timberland cut is replanted each year.[15]

VIII. FISHERIES

228 There are four main categories of
433 fisheries on Formosa -- deep sea, inshore,

14. Ibid., No. 3, March 1955, p. 104.
15. Ibid., p. 106.

45:Stanford U. S-4, 5 1956 AD1 Formosa
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coastal, and fish culture. Coastal fishing is most important, since it furnishes more than 50 per cent of the fish catch every year and serves as a source of income for over 140,000 fishermen -- approximately 61 per cent of the population who earn their living in the various fishing industries.[16]

Fishing has become an increasingly valuable part of the island's economy (see Table 9). More efficient methods have been introduced, there are a greater number of powered fishing vessels available today, and a large area is under culture. However, annual production still falls short of the minimum per capita consumption requirements, estimated to be approximately 42 grams per day. Only in the year 1954, when production was approximately 152,500 metric tons, was the minimum requirement reached. Further increases are necessary, for the optimum per capita consumption is estimated to be as high as 84 grams per day. Neither coastal fishing nor fish culture can be increased substantially. The Formosan government must find means to encourage deep-sea and inshore fishing.

16. China Annual 1954, Vol. 3, p. 86.

45: Stanford U. S-4, 5 1956 AD1 Formosa AD1

(Table 9 follows p. 556.)

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Table 9. Production of Fish*
(in 1,000 metric tons)

	Total	Ocean Fish Catch			
		Deep Sea Fisheries		Coastal fisheries	Fish culture
		Government	Private		
1936	93.0	26.0		52.0	15.0
1937	94.0	30.0		48.0	16.0
1938	90.0	34.0		39.0	17.0
1939	98.0	40.0		43.0	15.0
1940	119.0	57.0		52.0	10.0
1941	85.0	28.0		45.0	12.0
1942	68.0	21.0		33.0	14.0
1943	47.0	5.0		32.0	10.0
1944	23.0	1.0		16.0	6.0
1945	17.0	#		12.0	5.0
1946	51.0	2.6	0.4	38.0	10.0
1947	62.0	3.0	-	44.0	15.0
1948	83.0	2.7	4.3	51.0	25.0
1949	80.0	2.9	2.1	52.0	23.0
1950	84.0	6.1	5.9	47.0	25.0
1951	104.0	10.4	5.6	63.0	25.0
1952	122.0	10.9	6.1	74.0	31.0
1953	130.6	14.6	9.6	67.9	38.6
1954	152.5	14.5	12.5	83.9	41.6

* FOA Mutual Security Mission to China, Taiwan Economic Data Book, Part II, Vol. 3, Taipei, 1955.

Not available.

[table 9 follows p. 556]

Table 1. Index of Industrial Production in Formosa*
1941 = 100%

Industries	1937	1941	1946	1950	1952	1954
Power	56	100	46	101	134	175
Transportation	61	100	79	138	168	223
Chemical	84	100	33	136	162	267
Fertilizer	85	100	19	185	537	582
Food Processing	106	100	20	77	82	109
Metal & Machinery	49	100	29	52	66	108
Mining	75	100	34	56	87	85
Textiles	67	100	21	286	684	1,270
Timber	58	100	24	70	96	115
All Industries	79	100	32	84	111	152
Population (Millions)	5.6	6.2	6.7	8.9	9.5	10.1
Per Capita Production in All Industries	88	100	30	63	75	93

* Economic Data Book, Part II, Vol. III, prepared by FOA Mission to China, March 1955. The peak year under the Japanese was 1941.

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45:Stanford U. S-4, 5 1956 ADI Formosa
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45: Stanford U. S-4, 5 1956 AD1 Formosa AD1

(Table 2 follows p. 564.)

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Table 2. Industrial Output of Formosa in 1945, 1952, 1953, 1954 as Compared with the Record Production Under the Japanese

Commodities (with unit)	Peak Year Under Japanese	1945	1952	1953	1954
Sugar (1,000 MT)	1,374 (1939)	86 (1946)	520	883	701
Flour (MT)	13,000 (1934)	3,879 (1946)	16,476	69,163	136,944
Fertilizer: #					
a) Calcium cyanide (MT)	12,647 (1941)	-	69,070	73,145	71,747
b) Calcium superphosphate (MT)	25,449 (1943)	400	62,064	69,145	78,049
Laundry soap (MT)	5,115 (1939)	-	17,164	16,128	17,166
Cement (1,000 MT)	303 (1944)	78	445	519	536
Paper (MT)	25,547 (1940)	2,552	22,150	26,912	33,792
Cotton yarn x (bales)	-	825	74,831	107,464	127,012
Cotton cloth (1,000 yards)	4,296 (1940)	1,111	89,291	152,435	180,098
Canned pineapple (1,000 cases)	1,641 (1938)	20	428	569	779
Gasoline y (Kl.)	6,778 (1939)	1,066	80,316	108,943	136,206
Electricity z (Kw.)	178 (1944)	80	232	271	317
Coal (1,000 MT)	2,854 (1944)	880	2,286	2,392	2,117
Sulphur (MT)	1,381 (1937)	35	5,081	3,478	5,067

* Figures from Economic Data Book, Vol. III, prepared by FOA Mission to China, Part II, March 1955.

\# Fertilizers: (a) calcium cyanamide, manufactured as nitrolime; and (b) calcium superphosphate.

x One bale of cotton yarn weighs 400 pounds.

y One kiloliter is equivalent to 26.417 gallons.

z Actual peak load.

[Table 2 follows p. 564]

The increase from 1950 to 1953 was, for the most part, in private industries, manufacturing consumer articles, including textiles, soap, rubber goods, paints, matches, drugs, aluminum wares, bicycles, electric fans, and sewing machines. Among these, textiles, soap, and rubber goods have increased production most rapidly. Producing only 12 per cent of the textiles consumed locally in 1935, Formosa is now in a position now only to meet the expanding requirement of a growing population, but also to provide a substantial amount of cotton cloth for export. Except for automobile tires, nearly all the rubber goods needed on the island are manufactured locally. In 1939, the year of record soap production under the Japanese, 214,830 cases (5,115 metric tons) of laundry soap were produced. Today there are one government and ninety-three private producers, and the total production capacity of laundry soap is 125,000 cases (2,500 metric tons) per month.[9]

The rapid growth of private industries is attributed to the following factors:

1. Formosa has many basic raw materials, coal, salt, limestone, sulphur, ceramic clay,

9. Economic Data Book, Part II, Vol. III, preopared by FOA Mission to China, Taipei, March 1955, p. 99.

timber, and is also rich in oil and a favorable climate.

2. It has abundant power and good means of communication.

3. A great deal of dismantled equipment has been imported from the Mainland.

4. As a result of the massexodus from the Mainland, Formosa has many trained personnel

5. Labor supply with experience of mechanical operations is plentiful.

It should be noted, however, that 90 per cent of the private factories are of very small size, operated by a single owner. More than half have less than 5 hired workers, one-sixth from 6 to 10, and a fifth from 11 to 30 workers. Ninety-five per cent have capital of less than NT $50,000 (US $3,000). Twenty-six per cent depend entirely on manual labor, 67 per cent use a motor under 15 horsepower, and only 7 per cent use motors of 15 horsepower or more.[10] On the other hand, the government

10. Arthur F. Raper and others, Urban and Industrial Taiwan, Crowded and Resourceful, published by FOA/MSM to China and National Taiwan University, Taipei, 1954, pp. 122-23.

45:Stanford U, S-4, 5 1956 AD1 Formosa
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Table 4. Approximate Percentage Distribution of Value of Major Industrial Products from Government and from Private Factories, Enterprises, and Mines on Formosa, 1953*

Type of Production	Government Enterprises	Private Enterprises	Total Value of Industrial Production
Percentage distribution of value of all industrial production	65%	35%	100%
Sugar and by-products	98	2	18
Transportation	86	14	13
Textiles	37	63	10
Mining	15	85	7
Alcoholic beverages and tobacco	100	-	6
Metal Products	16	84	6
Edible oil	3	97	6
Timber	52	48	6
Petroleum products	100	-	5

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(continued)			
Rubber goods	6	94	4
Electric power	100	-	4
Fertilizer	100	-	4
Machinery	24	76	3
Cement	100	-	2
Paper	61	39	2
Chemicals	82	18	1
Canned pineapples	62	38	1
Salt production	100	-	#
All others	53	47	2

* Raper and others, ibid., p. 118.
\# Less than 1 per cent.

45:Stanford U. S-4, 5 1956 AD I Formosa
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II. MINERAL RESOURCES [16]

135 Although many of the mountainous areas in Formosa have not been fully explored, the island does not appear to be rich in mineral resources nor are those that are known available 328 in quantity. Formosa does produce coal, some 316 gold, copper, petroleum, salt pyrite, and 317 sulphur. Some coal and salt is exported. All of the other minerals are for domestic consumption. Smaller quantities of mercury, manganese, asbestos, mica, and gypsum are also produced. Bauxite, necessary for the aluminum industry, and gypsum, used in cement production, are imported, since they are not found in sufficient quantities on the island. 316 The production of the various mining industries 433 in 1953 and 1954 is given below.

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16. Statistical information in this section, unless otherwise specified, is in large part from Taiwan Economic Data Book, Vol. 3, Taipei, 1955, by Foreign Operations Administration, MIssion to China.

438 316 328 PRODUCTION OF MINING INDUSTRIES
1953-54 */

	1953	1954
Coal (1,000 metric tons)	2,393	2,100
Crude petroleum (kiloliters)	2,830	5,571
Natural gas (1,000 cubic meters)	30,925	28,962
Sulphur (1,000 metric tons)	3	6
Pyrite (1,000 metric tons)	23	25
Gold (kilograms)	772	670
Silver (kilograms)	651	624
Copper (1,000 metric tons)	13	10
Salt (1,000 metric tons)	162	369
Gypsum (1,000 metric tons)	6	3
Mica (1,000 metric tons)	24	20

*/ China Annual 1954, Vol. 3, p. 48.

135 Estimated reserves of selected minerals are given in the following table. It would appear, from this brief survey, that Formosa possesses limited mineral resources and few of the mineral requirements of modern industry.

C. Salt

317 433 Salt, available in quantity, is not produced from rock salt but by the evaporation of sea water on the western seaboard. The fields are centered around the towns of Anping, Putai, and Peimen. About 5,000 hectares of land were used as salt fields in 1954; production amounted to 369,000 metric tons. Domestic markets require approximately 75,000 metric tons a year, thus leaving a sizable amount of salt for export.

III. ELECTRICITY

376 Formosa has a number of short, swift-flowing rivers which are estimated to possess a total gross hydroelectric potential of some 3,300,000 kilowatts. According to a report made by the Taiwan Power Company, approximately 12 per cent (378,000 kilowatts) of the gross potential had been developed as of 1955. Formosa's 377 375 estimated thermoelectric generating capacity is 142,550 kilowatts, giving the island, as of 1955, approximately a total generating capacity of 520,550 kilowatts. The peak load in that year is estimated to have been 360,000 kilowatts.

377 Only the Taiwan Power Company produces electric power for general distribution. Some government and private enterprises generate power for their own consumption; notable among these enterprises are the Taiwan Sugar Corporation, the Taiwan Pulp and Paper Corporation, the Taiwan Cement Corporation, and the Taiwan

379 Formosa has not yet exploited the hydroelectric potential offered by its heavy annual rainfall and the steepness of its river gradients, and no sustained effort has been made to compensate for the varying water reserves available at different times of year, headwater erosion, the narrow valleys in which the rivers flow, and the silt and gravel which combined to reduce the efficiency of the streams as a source of power. For these reasons, the economic development of potential power sites is as important to Formosa as the implementation of flood control and irrigation programs.

Currently, the Taiwan Power Company has established a committee to investigate and plan the generation of power by atomic energy on Formosa.

IV. FOOD PROCESSING INDUSTRIES

A. The Production of Sugar

249 The history of the sugar industry in Formosa
● 433 goes back to 1349, when islanders "boiled sea
431 water to make salt and fermented molasses to produce liquor." [17] In 1650, when the Dutch were occupying Formosa, some 6,000 metric tons of sugar cane were produced each year. Of this amount, two-thirds were exported to Japan and marketed in lands as far away as Persia. Under the rule of Cheng Ch'eng-kung (Koxinga), who

17. China News Press, T'ai-wan Ching-chi Nien-pao, 1953 [Annual of Taiwan's Economy, 1953], Taipei, 1953, p. 45.

249 defeated the Dutch, annual production rose to
•433 18,000 metric tons, a large part of which was ex-
439 ported to the Philippines and to Japan. In 1870, total production amounted to 73,000 metric tons; 63,7000 metric tons were exported. During the Japanese occupation of Formosa, the island's sugar industry was developed to supply the require
257 ments of Japan proper. Four Japanese companies
433 controlled Formosa' sugar industry. During the
471 1930's, 42 mills able to process a total of 65,000 metric tons of sugar cane were in operation. The sugar syndicate owned 117 hectares of land, a railway extending 2,800 kilometers, had a staff of 5,000, employed 19,000 workers, and generated its own power. After the war, all of the mills cam under the control of the government-owned Taiwan Sugar Corporation. In 1947, six mills were incorporated, bringing the total number of mills in operation to 36. At present, only 26 mills are in operation; for reasons of economy, ten mills were shut in the period 1951-52, and production goals for 1954-55 were lowered.

472 In addition to the Taiwan Sugar Corporation,
257 which is the sole producer of refined sugar, some 52 private companies belonging to the Taiwan Brow Sugar Association produce brown sugar for domest use and foreign export.

257 The milling capacity of the 26 mills controlle
433 by the Taiwan Sugar Corporation is 49,350 metric tons of sugar cane per day; sugar recovery is abou 12 per cent. These mills operate an average of 150

433
257 days a year. The Taiwan Brown Sugar Association's member mills produce only 50,000 metric tons a year, representing approximately 10 per cent to 14.5 per cent of the sugar cane processed.

Since Formosa is only allowed to export 600,000 metric tons of sugar each year, according to the terms of the International Sugar Agreement, recent efforts have been directed toward modernization of plant facilities. The level of production has been reduced, and today Formosa processes only enough sugar to meet the demands of domestic consumption and the export quota.[18] Statistics on the production of sugar and sugar by-products are given in the table below:

PRODUCTION OF SUGAR AND SUGAR BY-PRODUCTS */

	(in 1,000 metric tons)			Yeast
	Sugar	Brown Sugar	Molasses	(1,000 kgs.)
1937	987	20	189	48
1938	967	24	206	119
1939	1,374	45	324	152
1952	520	11	143	61
1953	883	19	212	279
1954	701	13	185	638

*/ Taiwan Economic Data Book, Vol. 3, Part II, 1955.

18. Local consumption requirements for 1955 may be estimated at 108,800 metric tons, according to the consumption pattern established during 1932-41. During this period per capita consumption of sugar averaged 10.46 kilograms a year.

B. The Production of Canned Pineapple

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433 The Japanese encouraged the growth and canning of pineapples for export during their rule of Formosa. In 1938, Formosa was the third largest producer of canned pineapple, surpassed only by Hawaii and British Malaya. Since World War II, shortage of tinplate have caused a decrease in Formosa's pineapple production. The crops have been small, Formosa has lot many of its foreign markets, and tinplate for canning is at a premium. Efforts have been made to solve these problems, and production since 1951 has been on the increase.

PRODUCTION OF CANNED PINEAPPLE */
(in 1,000 case lots)

Year	Production
1938	1,674
1939	1,390
1950	226
1951	361
1952	427
1953	370
1954	780

*/ Taiwan Economic Data Book, Part II, Vol. 3, 1955.

C. The Production of Flour

256
433 It has been estimated that, as of 1953, Formosa required 108,000 metric tons of flour in order to meet civilian and military requirements.[19] Demand for flour has greatly increased as the result of the influx of refugees from the China Mainland, most of whom choose flour in preference to rice as the main staple of their diet. At present the island can produce only about 17,000 metric tons of wheat. Of this amount, and apparently far short of the island's requirements, only about 10,000 metric tons is available to be milled as flour; the remainder is utilized in brewing, for seed, and so forth. Natural conditions are believed to limit Formosa's optimum wheat production to 30,000 metric tons a year, and in consequence the island has found it necessary to import either flour or wheat. It was believed that the importation of wheat for domestic milling was most economical, in view of foreign exchange. The Foreign Operations Administration has been of aid in the importation of wheat and its distribution to local mills. As a result, the number of flour mills in Taiwan has increased in recent years, to the point where the milling capacity exceeds the requirements of the island.

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433 The provincial government owns two flour mills, and there are 33 relatively large private

19. James E. Auburn, "Taiwan Wheat and Wheat Flour Requirements," Chinese-American Economic Co-operation, Taipei, Mutual Security Mission to China, Vol. 1, No. 12, pp. 25-30.

[477] mills and 80 smaller mills scattered over the 256 island. Their combined productive capacity is 433 reported to be approximately 1,227 metric tons a day. If the mills were in operation only 250 days a year, their total capacity would be some 306,750 metric tons a year, far exceeding the estimated annual consumption requirement of 108,000 metric tons. The annual consumption requirement may have increased as the population increased in the past two years. The production goal for 1955 was set at 160,000 metric tons of flour, to be processed from 208,000 metric tons of imported wheat in addition to 8,000 metric tons of domestic wheat.

It should be noted that Formosa's production of flour is vitally dependent upon the importation of wheat. Delay or discontinuation of import would immediately affect local markets.

D. The Production of Edible Oil

388 Peanut oil and soybean oil are the most im-
433 portant types of edible oil produced in Formosa. The oils are used in domestic cooking. What remains after the oil has been extracted is used to feed animals or as fertilizer. Although enough peanuts are produced to meet domestic requirements, about one-third of the soybeans needed are imported. Approximately 500 producers of edible oil were reported in 1954. Most use cottage-type pressing mills, operated by human and animal labor. There are only 24 modern oil-pressing mills on the island. The production of peanut oil, peanut cake, soybean oil, and soybean cake is

45:Stanford U. S-4, 5 1956 AD 1 Formosa
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shown in the following table:

PRODUCTION OF EDIBLE OIL */
(in metric tons)

	Peanut oil	Peanut cake	Soybean oil	Soybean cake
1938	3,007	4,511	2,043	19,508
1939	2,525	3,788	2,410	19,520
1952	5,112	7,846	4,980	43,835
1953	5,900	8,850	9,339	68,506
1954	5,360	8,040	7,101	51,964

*/ Taiwan Economic Data Book, Part II, Vol. 3, 1955.

V. CHEMICAL INDUSTRIES

A. Fertilizers

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433 The importance of fertilizer for Formosa lies in the fact that so little of the island is suitable for agriculture that what arable land there is must be constantly enriched by chemical and natural means. The fertilizer industry is expanding, and in the next decades will offer employment to many and decrease the amount of fertilizer it is necessary to import to Formosa.

Experts attached to the Joint Commission on Rural Reconstruction have estimated that, according to Formosa's present soil and climatic conditions, the island has need of a minimum of 580,000 metric tons of chemical fertilizers each year. In order to secure optimum growth of crops, 1,000,000 metric tons of chemical fertilizers are needed annually. However, as of early 1955, the productive capacity of domestic plants was approximately 185,700 metric tons per year.[20] In order to expand production of fertilizers, the construction of four additional plants has begun, and when they are completed they will increase total capacity to over 383,000 metric tons per year. Further expansion is feasible, provided that sufficient investment capital is made available. Most of the

20. Industrial Development Commission, Fertilizer Taiwan, Taipei, 1955, pp. 4-6.

45:Stanford U. S-4, 5 1956 AD 1 Formosa

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raw materials necessary for the processing of fertilizer are available on Formosa. The island has a relative abundance of limestone, coke, coal, pyrite, and serpentine; phosphate must be imported. However, the present expansion program will only provide two-thirds of the minimum fertilizer requirement of the island. The following table compares the production and importation of chemical fertilizers.

PRODUCTION AND IMPORT OF CHEMICAL FERTILIZERS */

	Production	Importation
1937	31	413
1938	27	444
1939	34	356
1951	112	235
1952	150	403
1953	166	253
1954	168	359

*/ Industry of Free China, Vol. 2, November 1954, pp. 90-91, and Vol. 3, May 1955, pp. 56,70.

B. Alkali Products

385 433 The alkali industry, in support of various other chemical industries, has been expanding steadily since World War II. Caustic soda and soda ash are used in pulp-making, aluminum-making, soap-making, and glass-manufacturing. Chlorine is used for the production of bleaching powder, insecticides, and so on. Production of some alkali products are given in the table below.

ALKALI PRODUCTION *

	Caustic Soda	Soda Ash	Liquid Chlorine	Bleaching Powder
1952	8,526	609	1,286	1,526
1953	10,181	915	1,823	1,330
1954	14,487	1,163	2,667	1,787

*/ Taiwan Economic Data Book, Part II, Vol. 3, 1955.

C. Cement

339 433 Formosa's sole domestic source of cement, the Taiwain Cement Corporation, was established in 1946 when the government consolidated and reorganized three cement works and two cement-products plants formerly owned by Japanese concerns. In 1954, the management of the corporation was transferred to private ownership. The total productive capacity of the three plants -- in Kaohsiung, Suao, and Chutung -- was estimated at 670,000 metric tons a year; actual production

339 in 1954 was approximately 536,400 metric tons.
433 With the exception of gypsum, which must be imported, all the raw materials required for the manufacture of cement can be had locally. (According to production estimates for 1955, approximately 12,900 metric tons of gypsum are requi in order to produce 500,000 metric tons of cement.)

D. Paper

289 Waste timber, from which pulp is made
433 for the manufacture of paper, is easily available in Formosa, and the paper manufacturing indust was extensively developed under Japanese rule. As of 1954, there were 40 paper mills in Formo the largest is the Taiwan Pulp and Paper Corpor tion. The corporation produced 12,900 metric tons of paper in 1954; all other mills combined produced a total of 14,620 metric tons.

E. Other Chemical Products

381 The yearly production of other chemical
433 industries on Formosa are list ed in the followin table:

45:Stanford U. S-4, 5 1956 AD 1 Formosa
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OTHER CHEMICAL PRODUCTS */

	Unit	1953	1954
Alcohol			
DDT (100 per cent)	(kiloliter)	25,262	14,708
Camphor	(kilogram)	117,572	446,026
Soap	(kilogram)	263,906	181,043
Paint	(metric ton)	17,106	18,076
Printing Ink	(metric ton)	1,992	2,530
Active Carbon	(kilogram)	150,694	151,715
Matches	(1,200 boxes)	222,577	215,945
Toothpaste (tube)	(gross)	22,767	31,574

*/ Taiwan Economic Data Book, Part II, Vol. 3, 1955.

45:Stanford U. S-4, 5 1956 AD 1 Formosa
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VI. TEXTILE INDUSTRY

288 433 Among the major industries in Formosa, the textile industry has shown the greatest expansion since World War II. (The production of fertilizer and the production of light and power have expanded only slightly less rapidly.) The textile industry was one of those major industries to which the government gave special encouragement after the war.

During the Japanese occupation of the island, approximately 10-20 per cent of the island's textile requirements were supplied by domestic mills during the period 1920-42. However, the major portion of the production was gunny sacks. Consumers' textiles were imported from Japan.

In 1945, when the island was restored to China, there were only 14,652 serviceable spindles and 1,693 power looms, of which only 8,268 spindles and 428 looms were in operation. As of 1954, there were 18,844 spindles and 11,288 power looms installed in 14 spinning mills and 269 weaving mills. In addition, there were approximatel 200 hand-operated looms owned by some 100 small, privately owned mills. There were also 7 worsted mills, with 10,304 woolen and worsted yarn spindles and 208 looms. Production capacity as well as actual production far exceeded consumption requirements. In 1954, worsted mills cut production by 50 per cent, and as of September 1954, of the total of 252 privately operated weaving mills, 9 were closed, 77

288 suspended operations, and the remaining 166
● 433 mills reduced their work-day to eight hours.

248 The textile industry in Formosa was
433 established on the assumption that a sufficient amount of raw cotton could be imported to furnish the material for the production of cotton yarn and cotton cloth. Now efforts are being made to satisfy this demand through domestic production of cotton, and the initial experiment -- transplanting Texas cotton to Formosa -- has been pronounced a success. It is doubtful, however, that in the near future Formosa can supply her total raw cotton requirements. In 1954, raw materials imported for the textile industry cost the island approximately US$20,000,000, and it is believed that this import rate will continue if Formosa's enormous textile industry continues operation at its present level.[21] The following table gives the textile production of Formosa since 1951.

21. T'ai-wan Ching-chi Yüeh-k'an [Taiwan Economic Monthly], Vol. 12, No. 1, July 1954, p. 71.

45:Stanford U. S-4, 5 1956 AD 1 Formosa
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TEXTILE PRODUCTION */

	Cotton Yarn (Bale)	Cotton Cloth (1,000 yards)	Woolen cloth (1,000 yards)	Gunny sacks (per 1,000)
1951	39,567	61,836	442	5,240
1952	74,831	89,293	556	6,593
1953	107,464	152,435	1,228	8,407
1954	127,012	180,098	1,491	9,087

*/ Taiwan Economic Data Book, Part II, Vol. 3, 1955.

VII. METALLURGY AND METALWORKING

A. Aluminum

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433 The Japanese, in the second phase of their economic development of Formosa, constructed aluminum plants at Kaohsiung and Hualien in order to take advantage of the abundant power available in the island. The Kaohsiung plant then had an annual capacity of 20,000 metric tons of aluminum ingot. (The Bayer process was utilized for ore separation.) During World War II, the plants were badly damaged. Following the war, the Kaohsiung plant was rebuilt, and what remained of the Hualien plant was sold to a fertilizer manufacturing company.

Formosa's only producer of aluminum ingot, the Taiwan Aluminum Corporation, has a productive capacity of approximately 8,000 metric tons of ingot and 4,000 tons of sheet aluminum at the Kaohsiung plant. Aluminum goods, such as home appliances, kitchen utensils, and quartermaster supplies for the military, are produced by 77 small privately owned companies and one government-owned company.

Of the raw materials needed for the production of aluminum, bauxite is imported from Bintam Island, Malaya, and petroleum coke is imported from the United States.

B. Steel and Iron

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433 The island of Formosa produces little iron ore. Production of pig iron, derived from

327 imported iron ore, amounted to 8,6000 metric
433 tons in 1954; reclaimed pig iron, derived from sc ap iron, amounted to 8,672 metric tons in the same year. The island has the facilities to produce 13,000 metric tons of pig iron and 15,290 metric tons of reclaimed pig iron annually. Small iron and steel plants (foundries, blast furnaces, rolling mills, electric furnaces) are located in Kaohsiung, Taipei, Patu, Tainan, Kang shan, Sungshan, Hualien, and Keelung.

325 327 433 Production of basic metals is given below:

PRODUCTION OF BASIC METALS */

(in metric tons)

	Aluminum ingot	Pig iron	Reclaimed pig iron
1948	2,509	9,221	3,284
1949	1,317	1,559	4,275
1950	1,764	78	5,600
1951	2,984	733	5,385
1952	3,856	620	6,415
1953	4,915	3,927	6,929
1954	7,131	8,591	8,772

*/ Taiwan Economic Data Book, Part II, Vol. 3, 1955.

177 Polynesian peoples inhabited Taiwan for centuries, and perhaps for millenia, unable to develop any effective political organization but sufficiently warlike to prevent the infiltration of peasants from the Mainland. In the sixteenth century the Portuguese came to the Ilha Formosa but did little more than give it the name. The Dutch, who ruled from 1624 to 1661, reported an immigration of Chinese sufficiently strong to be troublesome. This was a period of crisis in China, for the Manchus had replaced the Ming Dynasty in the North and were pushing southward. The exodus of Ming civilians and soldiers across the narrow waters to Taiwan increased until there was a sufficient concentration of strength to capture the Dutch fortresses. In 1683 Taiwan became a district of Fukien Province, a tiny segment of the great Empire of the Manchus.

161 177 The patterns of demographic and economic development that made modern Taiwan evolved in the two centuries of Manchu suzerainty. Population growth was appreciable as immigrants from the crowded provinces of Fukien and Kwantung re-enforced the natural increase of the earlier settlers. By the latter part of the nineteenth century, when Japan had awakened from Seclusion and was ascertaining the areas available for Empire, Taiwan was considered a prize worth acquiring. Three million Chinese peasants were occupied in the production of rice, sugar, camphor, oilcake and other tropical products. "Incidents" occurred, war ensued and the Treaty of Shimonoseki gave Taiwan to the Japanese in 1895.

ECONOMIC DEVELOPMENT

177 433 The economic development of Taiwan required the expansion of health and sanitary facilities that would permit the residence of Japanese and guarantee the expansion of a cheap and docile labor force to produce the agricultural surpluses that were the goal of conquest. The achievement of military and, ultimately, civilian control necessitated roads and transport facilities. These were built before products were available for movement to the coast and shipment to Japan. The cultivated area was expanded, great irrigation systems built, techniques improved, more efficient varieties of rice and sugar developed and fertilizers introduced. Numerous agricultural experiment stations insured the necessary research, while hundreds of Japanese men in the field supervised the productive process from the initial preparation of the soil to the final processing and marketing. The Chinese had

only to furnish their labor and then to give from their limited incomes to pay for the increasingly heavy fertilizer input that insured heavy yields three times a year from the same land. Taiwan was thus transformed into a garden island where only the most venturesome of weeds could grow. Increasing quantities of rice, sugar and tropical products were transported northward to meet the growing food deficits of Japan's increasing population.

PUBLIC HEALTH AND MEDICAL CARE

The Sanitary Bureau of the Police Department was the authority in public health. Administration and enforcement were supported by police power. In the prewar years there were about 2,000 qualified doctors. Many others were trained in Taiwan and given local licenses. At the end of the war there were some 5,000 to 6,000 local doctors, or almost one per thousand population. Since public posts and private practice were limited, many of these doctors were unemployed. In 1948 about 3,600 physicians were registered as engaged in private practice or public service. There were about 600 nurses and numerous midwives. In both these groups the majority were substandard in grade. The number of hospital beds included approximately 1,000 in the capital and perhaps 6,000 on the Island, most of them in small units. In 1948 effective hospital capacity was less than half this prewar level.

Under Japanese control plague was eliminated and cholera and smallpox became rare, although the last two recurred in 1946 to 1947. Tropical diseases are common, malaria in particular. The Japanese had a special malaria service, based on extensive blood examinations, which administered quinine to positive cases. By these means 30 to 40 per cent of the people were examined annually and malaria mortality was reduced by treatment. This suppression improved the health record temporarily, but it did not contribute to permanent amelioration. The program has since been largely discontinued.

THE INCREASE OF THE POPULATION

Population increase paralleled economic expansion. In 1905 there were 3.0 million people on the Island; in 1940, there were 5.9 million. Population thus increased 93 per cent in this 35-year period and virtually all

matrix could easily have reduced death rates to 12 or 15 per 1,000 total population and, if birth rates had remained at 45, shot the rate of natural increase from 2.5 per cent per year to 3.0 per cent or more. 165 563

THE BIRTH RATE

Neither the extension of cultivation, the increase of yields nor the health and medical activities in Taiwan produced any major changes in the familial patterns of the peasants. The recorded birth rate of the Chinese remained above 40. There were some slight evidences of a lower birth rate in the more prosperous and urbanized provinces, but the social and occupational groups that might have adopted the modern individual and familial values, rather than the traditional Eastern values, were few in numbers. 163

The growth implicit in the maintenance of fertility at the level that existed in Taiwan during the last decade of Empire was indeed rapid. The gross reproduction rate for the entire population was over 3.2 and the net rate over 2.0.

It is obvious that no population dependent on agriculture and inhabiting a limited and already densely settled area could reproduce indefinitely at the rate implicit in these figures. Potential growth was more rapid than the actual growth of the thirties, though, for any social and economic changes that would improve levels of living and contribute ultimately toward a reduction in fertility would produce immediate and more rapid declines in the death rate.

THE PROSPECTS: PREWAR JAPANESE VIEW

The balance between the people and the land in prewar Taiwan may have appeared precarious to the Western student but the Japanese foresaw many decades of further expansion before the Malthusian pressures of the people on the food supply would limit either population growth or exportable surpluses. Rice production had increased from 2.1 million koku in 1900 to 4.9 million in 1923 and 9.7 million in 1940. In the latter year the export surplus amounted to five million koku. By 1950 rice production would amount to 12.8 million koku and the quantity available for export to Japan Proper would increase by almost a million koku. 433 241 439

The Japanese also realized that Asian hegemony implied a destiny beyond the agrarian for the once subject peoples and that Japan's own demographic

433 resources would have to be supplemented by the integration of Taiwanese and
241 Koreans into the industrial nexus of Empire.
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THE CONTEMPORARY PROSPECTS

178 Today the plans of the Japanese for the further development of Taiwan
727 are somewhat irrelevant. The Chinese administration has penetrated every aspect of political, social and economic life. Initially the transfer of sovereignity resulted in sharp retrogressions. The great war industries were destroyed. The Japanese army departed, but Chinese soldiers from the Mainland now use the island for training to repel an invasion expected from the Mainland. The land is cultivated but the agricultural supervisors have been repatriated to Japan. In October, 1948, when we were in Taiwan, there were markets for surpluses that would yield funds to purchase the fertilizers essential to the maintenance of production. Disease and premature mortality were reported to be increasing. All this was descriptive, for statistics were a casualty of the liberation. Bureaucrats and university professors had been moved back to Japan and Japanese policy had produced totally inadequate numbers of Taiwanese to take their places.

177 The political travesty of the Chinese liberation of the Chinese popu-
198 lation of Taiwan needs no recapitulation. It placed almost insuperable obstacles before even the most reasonable programs and the most capable administrators. Furthermore the Taiwanese were now a peculiar Chinese-Japanese cross-product and the cultural heritage of the half century of occupation complicates all aspects of Chinese-Taiwanese adaptations. The Taiwanese spoke Hakka or Fukienese, neither comprehensible to the other; the Mainland Chinese spoke Mandarin, which was incomprehensible to the Taiwanese who spoke either Hakka or Fukienese. So Japanese became the lingua franca between Chinese groups.

Had Taiwan been reintegrated into a functioning Republican China it seems probable that inundation from the Mainland would have reduced the Taiwanese to Chinese levels of living and absorbed their particular population problem into one of the greatest of all population problems, the demographic prospects of a modernizing and industrializing China. Today the future of the Taiwanese people is unpredictable. They are again pawns in a struggle for control of the East.

52:Barclay S-5 (no date)1954 AD1 Formosa AD1

CHAPTER II

"Economic Development" in Taiwan

RULING TAIWAN was a task that the Japanese approached with high hopes. Because their goals were ambitious, the problems were more formidable than they might have been with a more modest and conventional colonial program. Their officials in Taiwan were the first overseas administrators in the Empire, and felt a responsibility to make the colony appear worth while at home.[1] Whatever their wider aims, their strongest aspirations for the island expressed themselves in energetic economic policies—policies pursued with such determination that they profoundly altered many aspects of Taiwan's economic life. In the course of their administration, Japanese nationals came to look upon enhanced production with a two-fold purpose: to secure profits for certain individuals and groups, and to promote the self-sufficiency and military strength of the Empire.

Here we shall examine the techniques of their economic program, survey its operation, and endeavor to make some appraisal of the accomplishments. A closer view of its significance for the everyday affairs of the population is reserved for the next chapters.

The situation that the Japanese first encountered in Taiwan was one of long-established tradition, in which a small amount of innovation could go a long way. Agriculture was the main source of livelihood for practically all Taiwanese. The particular manner in which farming is organized in Taiwan tends, as it does in most of the Far East, to shield it from the intrusions of the modern world. Under the Manchu regime the Chinese inhabitants of Taiwan had developed farming along the familiar lines of their forebears on the China coast. Farms existed on a local village scale and were operated for local subsistence. Most of any exportable surplus of production was removed from the villages in the form of taxes or rent. What was left became absorbed in the costs of civil disturbance, misgovernment, and expansion of settlement, rather than going toward broadening commercial or other opportunities of the cultivators themselves. Whatever may bring about such a situation, it is one that tends to

[1] Most of the later Japanese publications about Taiwan's future also stressed the island's potentialities as a base for southward expansion of the Empire. The grandeur of these proposals suggests that some of them may have been invented in search of favor for their authors more than in serious expectancy of being carried out.

52:Barclay S-5 (no date)1954 AD1 Formosa AD1

discourage innovation in agricultural technique, and to keep at low levels the output per person working in agriculture. An economy in this condition requires important modifications when "economic development" is desired. Farming must be made more productive, and radical progress is necessary in other pursuits. Barring some curtailment of consumption, such a change always implies expanding production faster than what is immediately consumed.

One of the keys to the Japanese colonial program in Taiwan, and to its demographic consequences, was how they set out to induce this saving. They chose the course of concentrating the additions to income from production in a few corporate business structures, instead of relying on the savings of individuals in Taiwan. Presumably this has been a goal in the management of most colonies, since indigenous sources have rarely been relied upon for large-scale investments. Its corollary—policies to suppress gains in individual native incomes—has been the chief source of hostility against colonial powers. But while most other nations have had only moderate luck in pursuing this objective, with the Japanese it was an outstanding success.

They took care that the formation of capital proceeded rapidly and from internal savings alone. Even in Japan, which in some respects is closely comparable, the whole pattern and purpose were different. While the Japanese were leading their own economy toward self-sufficiency in manufactured commodities, economic change in Taiwan was being contrived with a still surer hand to move in an opposite direction, toward complementarity with Japan. The output of the island was gradually shaped so as to furnish a net contribution of agricultural and semi-processed food and related commodities every year to Japan. These were items which Japanese felt to be essential for their more ambitious plans at home, and which for various reasons they wished to avoid purchasing outside Japan in ordinary world markets.

All the while, they mounted an impressive program of building up physical equipment in the island itself. Thus earnings were being reinvested on a large scale at the same time that they were also being drained off at a considerable pace by exports to Japan. This feat had to be accomplished in only one way—by raising the output of the island sharply while not greatly changing the levels of consumption for the population at large.[3] In this respect the Japanese managed

[3] The alternative—of gains by depressing popular consumption—should probably be ruled out. It cannot be conclusively demonstrated either that levels of living rose or

52:Barclay S-5 (nodate)1954 AD1 Formosa AD1

the process of capital formation in Taiwan in basically the same way as at home, by prodding the economy at critical points with innovations and developing special social policies to divert the gains from consumption to investment. The success of domestic saving in Taiwan is simply accentuated by the steady flow of commodity shipments to Japan, whereby Taiwan as an enterprise did more than pay its own way.

This success is best summed up in the yearly figures of trade with the outside world. From 1909 on, with the sole exception of 1913, there was an export balance every year in the value of Taiwan's external trade. Most of its entire trade was carried on with Japan—over 90 per cent after 1930 if Manchuria and Korea are included.[3] Related to the total value of exports, the balance amounted to a steady share of about 30 to 40 per cent of all exports to Japan, 25 to 30 per cent of all exports to the entire world, that were not paid for in the form of imports of commodities (see Table 4). It is not proper to infer from these figures that Taiwan occupied a "favorable" position, since apparently the balance was merely carried on the books of a few companies with home offices in Japan. This being the case, such figures probably even understate the amounts taken out.[4]

The Role of Government Policy

By implication, the foregoing account reveals that colonial rule yielded quick and gratifying results in Taiwan. These were not

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that they fell for Taiwanese. It does seem certain that on the average they must have risen somewhat, but that they did not move very far one way or the other. Undoubtedly some Taiwanese who took part in the new developments became richer, and many who did not became poorer. Agricultural output per farmer definitely increased, as the next chapter will show. There are figures (see Ch'en Cheng-hsiang, 1950, p. 151) that suggest a slight falling off of rice consumption per person, but they must be computed in a way that weakens their reliability. However, the large additions to Taiwan's economy under the Japanese were the new productive facilities, fixed equipment and market organization, which it is the purpose of this chapter to document. There is no way of showing how these improvements were shared by the Taiwanese, though we know that the Japanese took steps to keep the major shares to themselves.

[3] It is fairer to consolidate the "Yen Bloc" as a whole in computing these balances. To some extent imports from Manchuria and Korea were used to offset the account with Japan; this combined account shows a smaller balance than the account with Japan alone in most years. Separate data for Manchuria were not available in preparing Table 4. Aside from their monetary value on a balance sheet, the articles imported from Manchuria and Korea had a special importance, for they consisted mainly of fertilizers that were indispensable to Taiwanese agriculture.

[4] Grajdanzev (1942), p. 157, claims that the export balance cannot be materially reduced by taking account of hidden items; many of these, such as cash remittances to Japan, would actually increase it.

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achieved through the efforts of private individuals in a free investment market. The Government-General of Taiwan was given a free hand by Tokyo in most internal affairs, and displayed great interest and vigor in regulating all areas of business activity that it could effectively control. A large part in the formation of capital in Taiwan can be attributed to official steps deliberately adopted with this end in view.

On the one hand, these measures consisted of widespread rationalizations in agriculture and large investments providing technical economies to individual farmers; on the other, there were various devices to centralize the heavy investments in large blocs and thereby keep control over the entire venture. The former consisted mainly of improvements that could be initiated and carried out by Japanese without full participation by Taiwanese, and the latter of ways to guide the process and garner the returns. The one served to raise the average productivity of working Taiwanese without depending on them for inception; the other to avoid dissipating the earnings of the colonial enterprise as higher incomes among the Taiwanese, by confining them in the charge of a few Japanese.[5]

Although the Japanese treated their domestic agriculture in much the same way, they made use of their own farmers' earnings in furthering the growth of industry. The fiscal role of rural Taiwan corresponded to that of rural Japan, but in Japan the several lines developed together and were complementary. Fewer opportunities of this nature were exploited in Taiwan, for the complementarities were all external. This is shown in the other side of the picture of trade with Japan—that of imports and their composition. More than half of the value of imports from Japan during later years represented items that were clearly for current consumption.[6] There was surely nothing like the emphasis on heavy capital goods among the remainder that is found in the imports of Japan itself.[7]

Problems of Pacification

This study is concerned as much with broader aspects of organization in economic life as with the economic activities themselves. Thus

[5] One of the organizational devices for diverting this income away from consumption was, as in Japan, to make it flow into corporate rather than individual hands, where its disposition was more easily regulated.

[6] I.e., articles such as food, clothing, paper, beverages, textiles, manufactured consumer commodities, and the like. One suspects that a large part of these went to maintain the comforts of the Japanese living in Taiwan.

[7] For example, see Reubens, Edwin P. (1950), pp. 109-112.

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it is pertinent to examine the stages by which the Japanese spread their influence over business affairs. Before the Japanese occupation, Taiwan was a busy farm area producing chiefly rice and other foodstuffs for itself and neighboring countries. It still held virgin lands that yielded well to the cultivation of Chinese farmers, and was known among Mainland Chinese as one of the few places where fortunes could be made or lost quickly. It was known elsewhere for other features not unrelated to these—foreigners established some renown for the island's production of marketable crops like tea and camphor, as well as for its beautiful scenery and adventure. Some early Taiwanese had always enjoyed years of prosperity, subject to the vicissitudes of weather,[8] warfare among powerful families or with the aborigines, and to the unpredictable greed of officials.

Although agriculture was the mainstay of livelihood, there were the subsidiary pursuits commonly found from place to place in China. Additional opportunities arose in connection with commerce, which was the most flourishing sphere of enterprise. The export trade in the few products shipped abroad was the only spot affected by foreign influence. A small number of Western traders had stayed in Taiwan, arranging for the sale and delivery of the island's produce to the outside world, but the scope of their business operations was limited to buying and shipping. Even tea-growing, which an Englishman had begun, was left entirely to the local population and Chinese middlemen, up to the stage of packing and sending the tea abroad.

The settled portion of the island, often down to the actual appearance of its villages, was a close replica of conditions on the mainland of South China, 100 miles away. The Manchu government adopted policies calculated to restrict rather than encourage any growth or diversification of economic activities. It abhorred the prospect of having the profits of any sponsored enterprise go to foreign merchants, and suffered an incapacity for such sponsorship inherent in its organization.[9] Observers of the period saw little likelihood of change.

Hence Taiwan when the Japanese acquired it was already a granary ready to function as a going concern, but with some impediments to being operated as such. In contrast to both China and Japan, it

[8] These hazards were many and frequent. Lack of systematic attention to irrigation had placed farmers at the mercy of floods, local droughts and destructive hurricanes, and severe earthquakes were common.

[9] This aspect of early political and business affairs in Taiwan is described at great length in Davidson, James W. (1903), Chs. 14, 15, and 17.

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was a newly settled land whose surface still showed little strain of intensive clearing and cultivation, and whose manifest possibilities for wider exploitation in agriculture and other lines had scarcely been tapped. Merely imposing public order and effective political administration could hardly have failed to ensure general prosperity, and the Occidental community at the time contemplated the experiment with great interest.

The new authorities did not leave much room for doubt about their intentions for the economy. Even while engaged in some dissension and maneuver for power between their own civil and military officers, they quickly set about constructing railroads as a state enterprise, reinstituting an official monopoly of camphor (amounting to a world monopoly since Taiwan with Japan was the sole important world producer), nurturing one large company for practical research and experiment in sugar production, reviving the former domestic monopoly of salt, and executing a complete and accurate land survey—Taiwan's first—in order to regulate some of the discordant relations of tenancy among farmers and landlords.

Most of the administrative changes were based on a notorious need for reform of pre-existing practices. But all of these reforms were two-edged. Besides regularizing commercial practices and "correcting abuses," the official monopolies and export associations slowly made it impossible for foreign concerns to remain in operation. The revenues from key lines of business soon became centralized in either the Government-General or corporations explicitly controlled by it. Those relations began to appear between state and business that determined the future course of the fields involved. The land survey furnished a basis for levying a stiff land tax which brought forth a gratifying and dependable flow of revenue into the public treasury and helped to finance later development schemes.

If the overall design of economic expansion had been fixed in the minds of influential Japanese even before they took possession of Taiwan, and to some extent this seems likely, its timetable was not. They did not foresee, for example, that almost ten years of costly and arduous military campaign would be needed to subdue the aborigines and thousands of Taiwanese in the lowlands and foothills who had reverted to banditry. And it became apparent only after many Japanese lives had been forfeited to sickness that this "pacification" of the island had to be accompanied by full-fledged warfare against disease and a general sanitation program, in order that enough

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The most efficient view of total changes in the island's economy is by reference to its statistics of trade. As indicated above (Table 4), Japan succeeded in securing practically all of Taiwan's external trade to itself, if exports to Korea are counted. During the 1930's even traffic with China, just across the Straits, was almost eliminated.

Compared with a wide range of other Far Eastern countries, Taiwan under the Japanese came to hold a surprisingly high rank in the value of trade per person. At its peak shortly before 1940, the total per capita value of its trade was well above even that of Japan (see Table 5). Since this rank was attained under peculiar conditions,

TABLE 5

ESTIMATED PER CAPITA VALUE OF FOREIGN TRADE OF FAR EASTERN COUNTRIES CIRCA 1939*

(Expressed in U.S. Dollar Equivalents)

Country	*Year*	*Imports*	*Exports*	*Total*
New Zealand	1939	109	127	236
British Malaya	1939	61	72	133
Australia	1938–39	67	64	131
TAIWAN	1937	16	23	39
Korea	1939	15	11	26
Japan Proper	1939	10	13	23
Philippine Islands	1939	8	10	18
Burma	1938–39	5	12	17
Netherlands East Indies	1939	4	6	10
Thailand	1938–39	4	5	9
French Indo-China	1937	3	4	7
China	1939	0.85	0.25	1

* As reproduced in OPNAV, Civil Affairs Handbook. *Taiwan—Economic Supplement* (1944), p. 73.

Source: Far Eastern Unit, Bureau of Foreign and Domestic Commerce, U.S. Department of Commerce.

however, it does not mark Taiwan as an especially "advanced" area (in the sense of supporting bountiful levels of living) except by reference to the Japanese residents in the island.

Taiwan's position in trade with the outside world was created by heavy and increasing exports of a few products, mainly crops sent abroad in only slightly processed state. Compared with what took place in Taiwan's business and financial communities, there was remarkably little shift in the composition of its agricultural output

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(see Fig. 4). Together sugar and rice never lost their dominant position in the value of all crops produced. Despite some greater emphasis on finished sugar as a source of alcohol, the cane harvests gained very little in value over rice, even when the expansion of manufactures after 1935 would seem to have made this likely. In these terms sweet potatoes, which were always prominent in the Taiwanese diet, kept nearly a constant share of the total.

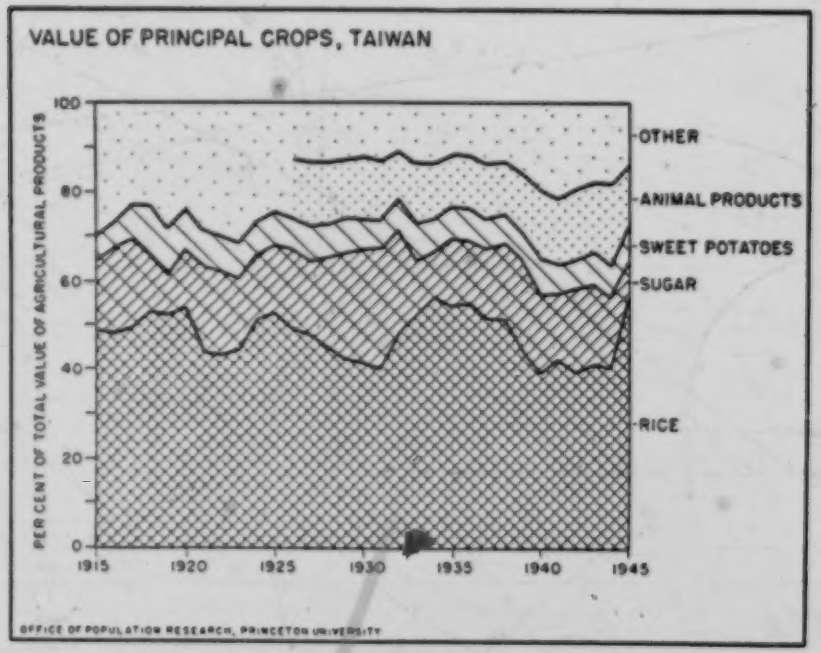

Fig. 4. Composition of the Gross Value of Total Agricultural Production, Principal Crops of Taiwan, 1915-1945.

Japanese promoted certain specialty crops, such as bananas and pineapples. These never occupied a large share in the total output of agriculture, but they more than kept pace with trends in the major crops (accounting for some of the change in the proportion of "other" products in Fig. 4). Together with tea, these crops made use of land not suitable for rice or sugar, and became important supplements to the total agricultural output. The Japanese encouraged such products by providing assured markets and technical supervision in their cultivation, and built canneries to process pineapples for export.

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The various staple and other crops that made up the bulk of Taiwan's agriculture eventually became distributed in a stable spatial pattern over the island. Sugar predominated over a large area in the Southwest, where it displaced rice in most of the land within the major public irrigation system. Tea in the North, and other specialty crops in the center, occupied some of the inland and foothill sections.[30] But it is important to note that rice culture, particularly in small paddy fields, overlapped with all other crops that were raised on the broad plain of Taiwan, and the labor-intensive and traditional farming practices associated with it have continued to be spread throughout Taiwanese agriculture down to the present.[31]

The exports of staple crops would not have risen as they did unless the yields of crops did the same. Gains in rice yields from the land did not come at once. They followed almost 20 years of painstaking experiment, starting in 1906, to find a strain of seed that could thrive under conditions in Taiwan. Almost no improvement was made until the so-called *horai* variety was successfully adapted from Japan. Following its introduction the average yields per hectare for all varieties gradually rose as much as one-fourth, primarily by growth of the area devoted to *horai* rice and the special techniques used in its cultivation. Neither the *horai* nor the native strains were greatly improved in yield thereafter; in fact, it appears that *horai* declined slightly from its high performance at the start as it spread to land less favorable than the experimental farms where it was first grown (see Table 6).

Systematic irrigation was one of the measures that raised the yields of land. Between 1930 and 1936 a few projects were carried out, by the government and by private companies, to introduce controlled amounts of water into lands that previously had been cultivated as dry fields. To illustrate approximately the trend of these events, Fig. 5 shows the changes in the area of land in paddy cultivation and that in dry fields. (Paddy land does not correspond exactly with the land that is irrigated on a large scale, for there were many paddy fields not included in these projects.) Since the total area cultivated was increased over these years, it is possible that the irrigation projects brought some land into cultivation that was formerly idle. More, however, was merely converted from dry to wet cultivation (see Fig. 5).

[30] See Ch'en Cheng-hsiang, *Atlas* (1950), Fig. 46f.
[31] *Ibid.*, Fig. 70.

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TABLE 6

IMPROVEMENT IN THE YIELDS OF RICE IN TAIWAN, 1916 TO 1945

Average Yields of Different Strains in Each Year, First and Second Crops Combined (Hectoliters of Rice per Hectare)*

Years	*All Rice*	*Horai Rice*	*Other Strains*	*Per Cent of Rice Land Devoted to Horai*
1916-20	17.8	—	20.1	—
1921-25	19.3	28.5	19.3	4.6
1926-30	20.9	22.7	20.4	19.9
1931-35	23.0	27.2	21.3	33.7
1936-40	25.5	28.2	23.2	47.3
1941-45	21.6	22.7	19.7	59.8

* Crop statistics in Taiwan were not kept in metric units. Figures in the *Statistical Summary of Taiwan* were all converted before publication.
Source: *Statistical Summary*, Table 203.

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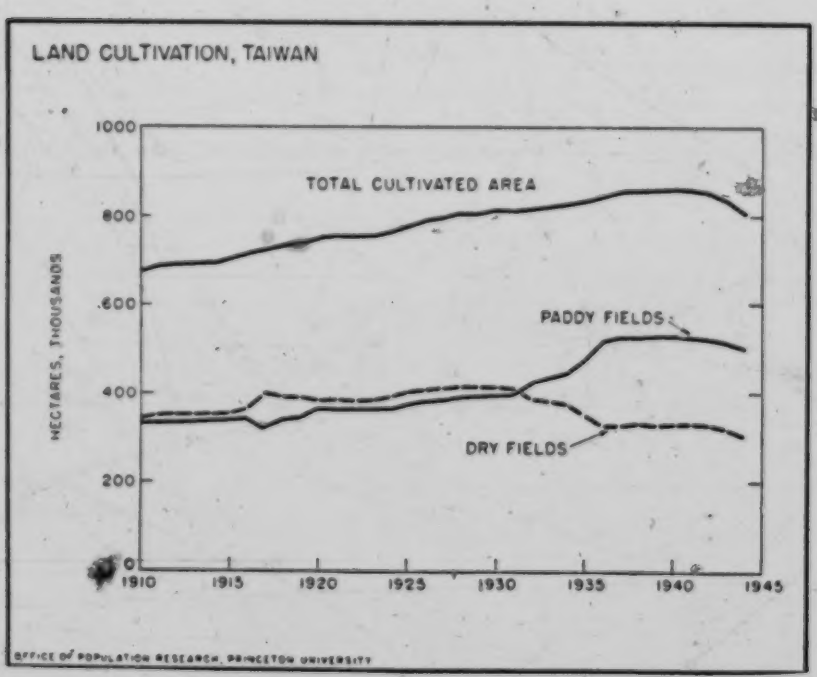

Fig. 5. Area of Cultivated Land, Taiwan, 1910-1944.

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Land that was improved in this manner not only yielded more at each harvest: over a third of the paddy land yielded more than one harvest each year. Under schemes for rotation and inter-cropping devised by the Japanese, it was not unusual to take three separate harvests from many of these fields in a year.

The labor of preparing the land, of weeding, and of harvesting was not saved by these changes. They may have involved some net additions—irrigation became a more complicated process in some cases, and the aqueducts for transporting the water required special maintenance. Japanese were aware that the soil could not be farmed more intensively without losing some of its fertility, and encouraged the use of commercial fertilizers, much of which they required to be prepared on the island. The remainder comprised the largest single category of Taiwan's capital imports, greater in value than the iron and steel and machinery which are sometimes identified with the needs of agrarian countries. Importing fertilizers for sale in Taiwan proved to be a profitable line of business; it was reported to be firmly in the hands of a few large Japanese concerns, a fact which should occasion no surprise. It was shortage of fertilizers that brought on declines in average yields of crops after 1940 (see Table 6, above).

The shift in official plans for Taiwan after 1930 leads one to look for some indication of results in the composition of Taiwan's products. The search is not very rewarding. In terms of gross value of product, agriculture did not lose its place as the foremost line of production until 1940 and later. Then it exchanged ranks with "Industry"—because farm produce fell off momentarily rather than because of any sharp rise in manufacturing (see Table 7).[32] The steady but slow decline in the share of agricultural production in earlier years had indicated a tendency to submit more of the agricultural produce to processing before it left the island, and not a shift from farming to manufacturing.

It is when the category of "industrial" production is examined in detail that some of the more recent trends emerge. In Table 8, evidently industry in Taiwan had always been centered around food products. Until the mid-'thirties these had amounted to three-quarters of the value of all manufactures. Only from then on did the effects of new economic goals begin to appear. The largest advances were made in some of the fields that had been smallest, espe-

[32] The sharp rise in the numbers of Table 7 was largely a matter of currency inflation.

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TABLE 7

GROSS RECORDED VALUE OF ALL PRINCIPAL TYPES OF PRODUCTION, 1915-1942

(Yearly Average for Each Period)

Years	Total	Agriculture	Mining	Fishing and Forestry	Industry
A. Millions of Yen:					
1915-19	262.7	144.5	7.2	9.1	101.9
1920-24	411.5	207.0	12.0	23.0	169.5
1925-29	559.0	293.6	16.8	31.8	216.8
1930-34	525.5	255.8	15.5	26.5	227.7
1935-39	901.0	432.9	39.6	41.5	387.0
1940-42	1388.4	576.4	62.8	91.8	657.4
B. Percentages of Total:					
1915-19	100.0	55.0	2.8	3.4	38.8
1920-24	100.0	50.3	2.9	5.6	41.2
1925-29	100.0	52.5	3.0	5.7	38.8
1930-34	100.0	48.7	3.0	5.0	43.3
1935-39	100.0	48.0	4.4	4.6	43.0
1940-42	100.0	41.5	4.5	6.6	47.4

Source: *Statistical Summary*, Tables 225-229.

TABLE 8

GROSS VALUE OF PRODUCTION RECORDED FOR "INDUSTRY" IN TAIWAN, BY LINE OF PRODUCT, 1921-1942

(Yearly Average for Each Period)

Years	Total	Textiles	Metal Products	Machinery & Equip.	Misc.*	Chemical Products	Food Products
A. Millions of Yen:							
1921-24	165	3	3	4	20	13	122
1925-29	217	3	4	5	32	20	153
1930-34	228	3	6	5	29	18	167
1935-39	387	6	17	12	45	38	269
1940-42	664	11	46	30	91	80	406
B. Percentages of Total:							
1921-24	100.0	1.7	1.9	2.1	11.9	7.9	74.6
1925-29	100.0	1.5	2.0	2.2	14.7	9.3	70.3
1930-34	100.0	1.1	2.5	2.3	12.9	7.8	73.3
1935-39	100.0	1.5	4.5	3.1	11.6	9.9	69.4
1940-42	100.0	1.7	7.0	4.5	13.7	12.1	61.0

* Includes Printing, Wood Products, Ceramics, and Other.
Source: *Statistical Summary*, Table 269 and Table 270.

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cially in chemical and metal manufacturing; their expansion did not have an appreciable effect in the production of all the island.

In other words, in spite of its expansion, industrial production had only begun to make headway in relation to agricultural output. Before 1940, manufactured commodities were still subordinate to Taiwan's farm products (and did not amount to much beyond processed sugar). Afterwards the Japanese did not have enough time to marshal the island's resources effectively in industry. We know this was not because they failed to make an effort—it was because they started too late.

Certain types of heavy investment had received their close attention ever since earlier years. Railway construction, for example, was pushed forward with enthusiasm from the very first. The time schedule of progress in expanding the public railroads was far ahead of their actual utilization (see Fig. 6). This was an investment which

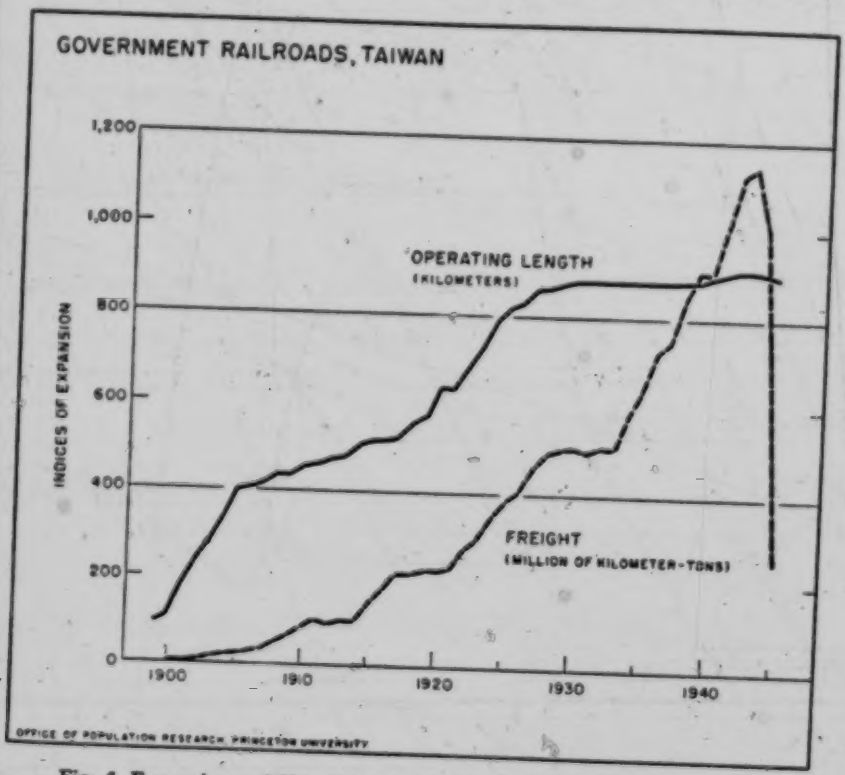

Fig. 6. Expansion and Use of Railroad Facilities in Taiwan, 1900-1945.

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supply of unoccupied land in Taiwan that could be drawn into cultivation, and so the needs of an expanding farming population and growing export demand had to be met by other means. The Japanese turned again to large investment to improve the effectiveness of the land that there was. The manner of constructing and upkeep of irrigation canals in Taiwan depended on mass labor. They were turned into an investment of labor, employed so as to produce an important form of capital equipment. The extent of irrigation more than kept pace with rural population growth while the Japanese were in control. Water for this purpose became indispensable in maintaining the output of farms. It was a hidden element in the improvement of rice and sugar yields, for the new varieties of seed that were developed were types that needed to be carefully irrigated.

Finally, the development of electric power was so closely related to the growth of Taiwan's newer industries that it should not be passed over without mention. Generation of electricity was one of the specialized heavy investments that formed the nucleus of the "industrial" progress after 1930. This is evident in a circumstantial way from the trends of capacity in generating power and the spread of factory employment (see Fig. 8). Factories in Taiwan came to depend on the cheap electricity that was developed at state instigation from water power. Judged from the size of their employment, the most important of the mechanized factories in the island were "food" (i.e., sugar) and metallurgical plants, which were the heaviest users of electricity.

As the next chapter will indicate, the Japanese broadened their objectives in Taiwan too late to put its human resources to best use in the new effort. Drawing the developed wealth of the island together into centralized control had turned out to be singularly advantageous. It had erected an entire structure of corporate organization from specialized financial services down to the coordinating of actual physical production of commodities. The Government-General had retained a close supervision over this structure, by licensing, regulation, and participation as a shareholder. As a program it quickly marshalled the production of Taiwan's farms into a profitable colonial enterprise.

When it came to pressing this development further, however, the Japanese made no real progress, for they had frustrated these aims in advance. Under agrarian conditions, industrial skills and experience in management are slower and more difficult to accumulate

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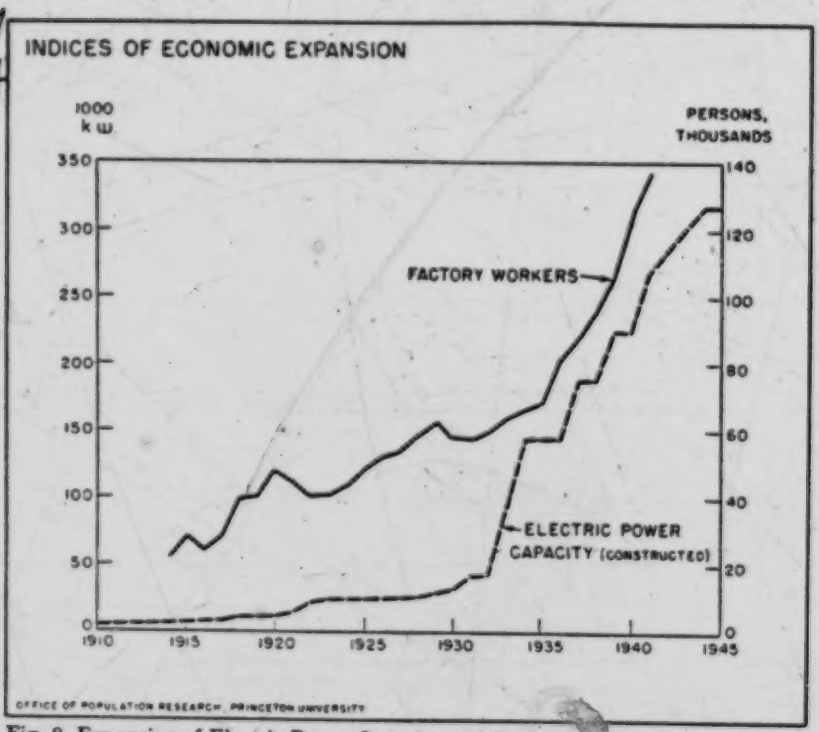

Fig. 8. Expansion of Electric Power Capacity and Factory Employment in Taiwan, 1910-1945.

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than material forms of capital. Japanese in the past had never cultivated an adequate fund of these among the Taiwanese. The same mechanisms which had served so well in channeling a large part of the total product each year toward desired uses had suppressed any opportunities for industrial employment that might attract Taiwanese who had administrative skills. What the Japanese themselves referred to as the "industrialization of Taiwan" was nothing but a corporate superstructure placed on an agrarian base. This was not capable of diffusing an industrial culture thoroughly among the general population, because it had been devised to prevent this very thing.

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241 year.[16] Double cropping fields not only uses land more intensively, but does the same for labor by spreading the intervals of greatest effort over a longer part of the year[17] (see Table 10).

TABLE 10

LABOR REQUIREMENTS FOR RICE CULTIVATION IN TAIWAN

Average Man-Hours Worked for One *Chia* of Rice*

Type of Work	*First Crop*		*Second Crop*	
	Man	*Man with Animal*	*Man*	*Man with Animal*
Seed Bed	6.3	0.8	1.9	1.4
Preparing Land	22.6	18.1	15.1	11.9
Transplanting	11.1	0.1	10.1	0.1
Fertilizing	7.1	0.9	4.0	0.1
Weeding	29.6	0.4	23.9	0.2
Irrigating	9.6	0.0	6.8	0.0
Pest & Disease Control	1.0	0.0	1.6	0.0
Making Windbreaks	0.1	0.0	1.8	0.0
Harvesting & Threshing	25.9	0.2	27.5	0.5
Total	113.2	20.5	92.7	13.1†

* Women's time was counted as 60-70 per cent of that of men, children's as 30 per cent. Figures represent averages from 36 farms, having a mean size of 1.6 *chia*. (1 *chia* = .96992 hectare) Table has no date.

† Published total does not check with sum of column.

Source: Mendiola, N. B. (1949), p. 72.

• 433 241 The data drawn upon thus far give no indication as to whether harder work and better techniques meant higher yields to farmers as well as to land. Fig. 9 helps in a rough way to settle the question. The number of farmers increased relatively more than the land area devoted to farms. It follows that the average gains in crop yields per person fell short of the gains in the yield of land. Fig. 9 also shows crudely the trends in the productivity of farmers, taking into account the major crops of Taiwan. They were unmistakably upward until

[16] If small-scale household farms are subject to two or three peak periods of work each year, shortages of labor tend to appear seasonally. When the seasons coincide for all or many farms, the shortages become general and cannot be met by hiring workers, since other available manpower is also in great demand. To maintain a household large enough to cope satisfactorily with this problem, the goal cherished by most peasant families is usually to bear the burden of supporting members who may not be fully occupied for the rest of the year.

[17] The net effect of double-cropping may even be to *increase* the amount of labor that goes into a given amount of output. However, some of the steps required to produce two crops where only one had been grown before are labor saving, i.e., involve the use of capital. The question of precise trends is too complicated to deal with here in these terms.

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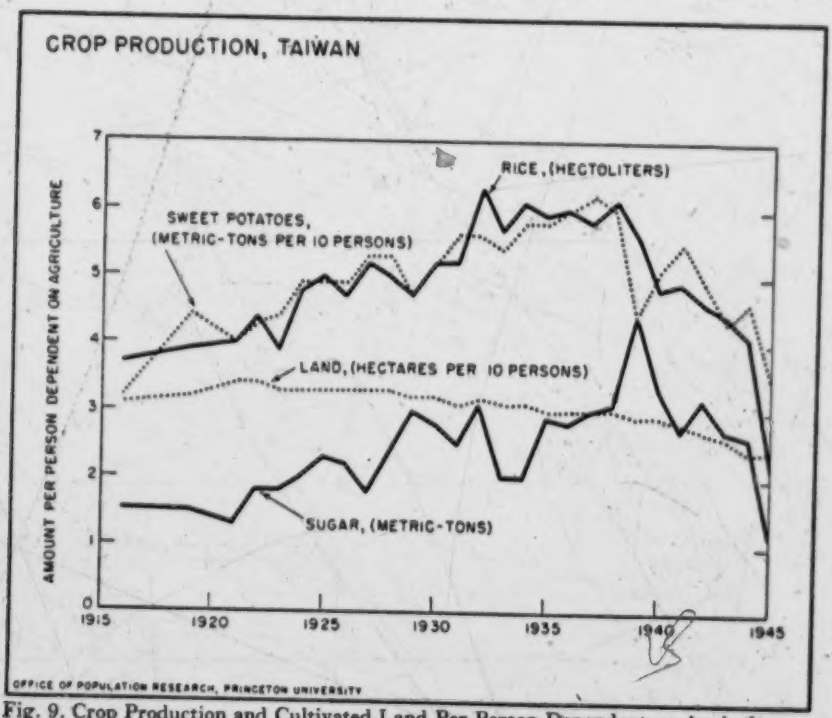

Fig. 9. Crop Production and Cultivated Land Per Person Dependent on Agriculture, Taiwan, 1916-1945.

the time of the war. But, considering the steady rise in the population dependent on agriculture, it is clear that the increased effectiveness of land use (discussed in Chapter II) did not owe so much to their colonial program as the Japanese themselves liked to believe. In part, it was merely a matter of more people working on the land.

Fig. 9 is based only on rice, sugar and sweet potatoes, and makes no allowance for the spread of some other crops during the late 1930's. In actual volume of crops produced, the product per person in agriculture therefore must have risen slightly more than the data imply. Diversification of this sort was of small benefit to most Taiwanese. Specialty crops like bananas and pineapples held a significance for the economy as a whole (they were export crops) greater than for individual farmers. Pineapples, for example, were grown entirely in plantations, and not by peasants as supplemental crops.

Trends in rice and sugar output were the trends for the rural economy as a whole; sweet potatoes are worthy of note because they

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433 241 have always supplied a large part of the Taiwanese diet. How well these three basic crops represent the whole of Taiwanese agriculture may be seen from their share in the total recorded value of farm produce (see Fig. 4).[18]

241 621 The spatial arrangement of crops discussed in the previous chapter has an important bearing on the question of persistence in organization of agriculture. Rice fields were found throughout the flat lowland area, overlapping in every civil division with the other types of farming. In its import for the nature of the rural society, this fact overshadows most effects of diversification and rationalization of farming. The types of social system that can give rise to paddy cultivation of rice seem to be uncommonly well equipped to resist change. They are centered around settled family relationships that provide for uninterrupted use of suitable fields over many generations. This is the case throughout most of the paddy-rice areas of Asia, where these conditions resemble what is to be found in Taiwan.[19] Hence, from this stability within farming itself, one should not expect to find that its social setting was greatly different as a result of Japanese occupation.

Changes in Pattern of Employment

463 Farming is so important to Taiwan that it has first been treated separately, with very little reference to its place among other activities. By viewing it in relation to the pursuits of the entire working population, we can take into account the nature of alternative opportunities outside of agriculture.

There would not be much point in looking for possibilities of non-agricultural employment if the economy could not have supported a larger proportion of people in other activities. This is where many agrarian countries have felt the effect of poverty to stand in the way of their industrial progress. From the start of its modern era, Taiwan's peculiar status as a food exporter suggests that food supply was no barrier. Since that time, special diligence in the matter made land and human effort more effective in producing crops. Advancing both of these aspects of productivity implied that at least some movement of people to pursuits outside of agriculture was economically feasible.

[18] These trends, of course, indicate nothing about "well-being" of farmers, since large capital charges (for irrigation, fertilizer, and government administration) were being made against farm incomes.

[19] See Taeuber, Irene B. (1947), pp. 21-43.

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tenants there has been a rent reform program, which went into effect in 1949 and set a maximum rental ceiling of 37.5 percent of the total yield (average rental had theretofore ranged from 46 to 62.5 percent of the total yield). The income of tenant farmers has, in consequence of the program, risen by an average of 30 percent. The reform legislation provides that where the main crop yields are less than 20 percent of normal the tenant shall not be required to pay any rent at all. It also gives the farmer security of tenure (landlords may no longer refuse to renew contracts in order to re-rent on more favorable terms), and it restricts landlords' right to dispossess tenants. By 1951, 97.54 percent of the tenant farmers had completed new contracts under the new law, and the landlord problem had been brought, for the most part, under control. The price of land has steadily declined, which, of course, enables more and more tenant farmers to buy land to own. The rent reduction program has been carried out in cooperation with a Chinese-American organization, the Joint Commission on Rural Reconstruction, which is responsible for a program of general agricultural improvement: the construction of irrigation dams and canals, reclamation projects, the making available of better seeds and fertilizers, animal disease control, the organization of farmer associations and rural cooperatives, and rural health measures.

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By the end of the period 1950–1951, the use of US-financed fertilizer had brought rice production to the highest peak in the history of Taiwan. In exchange for much-needed foreign currency, twenty-two thousand, five hundred eighty-seven metric tons of Taiwan's surplus were exported to Japan and South Korea. Other foods basic to local consumption were also above peak prewar production levels. Sweet potatoes were up 20 percent, wheat 165 percent, and peanuts 89 percent. Considering the handicaps under which the government started, the economy of Taiwan is now surprisingly stable, largely because of the increased agricultural productivity reflected in the foregoing statistics.

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Economic Reform

In 1949, to meet the economic crisis precipitated by the soaring inflation of the Chinese National currency, to which the Taiwan dollar was then linked, a fresh start was made by introducing a new currency, linked to the US dollar and backed by gold bullion brought over from the mainland. At the same time, a series of deflationary measures were enlisted. The government's expenditures, for example, were curtailed by reducing its personnel and cutting back certain of its activities; at the same time, its resources were increased by means of a new luxury tax (based upon ownership of property, including cars and refrigerators), a defense tax, the floating of bonds, and the sale of government assets. The program, as a whole, had the effect of encouraging private enterprise, so that the usual sources of revenue (customs receipts, returns from the salt monopoly, the postal services, and assorted government enterprises in fields like telecommunication, air transport, navigation, petroleum, aluminum, gold, coal, copper, and steel) became more productive.

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Industrial Recovery

In industry, Taiwan's return to prosperity has been extremely rapid. At the time of Japan's surrender, the annual coal production had dropped to 776,000 metric tons (as compared to peak production of 1,182,635 in 1941); electric power had fallen off to 52,646 KW (as compared to the peak load of 152,355 KW in 1943); the production of sugar (the chief product for export) had declined to 86,073 metric tons (as compared to 1,418,000 metric tons before WW II), that of cement to 78,000 metric tons (as compared to peak production

of 303,400 metric tons) and that of industrial salt to 67,000 metric tons (as compared to peak production of 465,000 metric tons). The production of chemical fertilizer (33,800 metric tons before the war) had come to a halt. Tea processing plants and pineapple packing plants stood deserted. In short, by V-J Day the ravages of war, materials shortages, and lack of maintenance had almost paralyzed the industry of Taiwan. The railroads had worn out no less than 1400 steel bridges which had to be classified as unsafe to use.

After V-J Day, rehabilitation work on the railroads was given a high priority. Eroded steel bridge spans were removed, worn-out sleepers and rails were replaced, road beds were reconditioned. Today, passenger traffic exceeds the peak load of the prewar period; freight traffic, after tripling itself in one year, is approaching prewar peak.

Rehabilitation of the power system made great demands on the ingenuity of the available Chinese engineers. Little foreign exchange was available with which to buy needed replacements, so that the repairs had to be accomplished by reworking obsolete and broken equipment scattered about over the island. Through tedious patching and repairing operations, and the acquisition of a few spare parts that could not be improved, they tripled generating capacity in two years. By 1951, capacity had reached an all time high of 217,000 KW. Today coal (1,451,000 metric tons in 1952), cement (389,000 tons in 1951), chemical fertilizers (more than three times prewar production), petroleum, cotton yarn (three times Japanese peak production) and cotton piece goods (four times Japanese peak production) have all surpassed prewar production figures.

The sugar industry, which, as in the past, is Taiwan's most important source of foreign exchange, has done less well by comparison with prewar standards, but not, or at least not primarily, because rehabilitation operations failed to be carried out. In 1945, 27 of 36 plants stood seriously damaged. By 1948, all the factories and plantation railways had been completely rehabilitated, and by 1950 sugar production had climbed back to 630,000 metric tons. The Taiwan Sugar Corporation's capacity is now over one million tons a year. In 1949–50, however, sugar dropped in price on the world market, and farmers turned from sugar to rice. In 1951–52, the world market price began to rise, and sugar production is gradually returning to its previous high levels.

Paper and pulp mills, machinery shops, shipbuilding, and aluminum works have, likewise, been gradually restored. Another worthwhile project has been the development of a fishery industry which has improved the Taiwanese diet (including that of the Nationalist Army) without great expenditures. American economic aid has played an important role in the rehabilitation and development of all these industries.

A labor insurance policy was put into effect on 1 March 1950. Its object is described as "safeguarding the livelihood of the workers and promoting harmonious relations between labor and management so as to ensure social security and high production." According to the Labor Insurance Regulations, all workers employed in public and private factories, mines, salt fields, communications, and public utilities in Taiwan shall be insured. It is compulsory labor insurance on a limited scale. The benefits are insurance against injury, death, maternity, disability, and old age. It also has provision for free medical clinics. This new system of social insurance was put into effect with the cooperation of the Chinese Federation of Labor, the Free China Labor League, and the Provincial General Labor Union. Their delegates also sit as members of the legislature of the provincial government.

The government has also carried out a tax reform and overhauled the tax collection system. The reform program went into effect on 1 January 1951. The number of distinct taxes was reduced from 20 to 11, leaving the income, inheritance, stamp, commodity, land, business, slaughter-house, entertainment and amusement, vehicle license, and household taxes.

48: Chen E-4 (no date) 1955 ADI Formosa ADI

corrected, the standardized death rate of the Japanese in Taiwan was 13.34 per 1,000, still far lower than the rate of 20.27 per 1,000 for their brothers in Japan proper[5]. The rate of infant mortality of the Japanese in Taiwan was also comparable to that of most advanced western countries. From this we can see that Japanese in Taiwan were under tremendously favorable circumstances. Their excessive benefits were enjoyed only at the expense of the land in which they lived.

Social change in Taiwan after the restoration in 1945 will help us to understand the character of colonial type of change. Under Japanese rule, manufacturing industry had attained a fair development, but it produced mostly processed agricultural goods or semi-manufactured goods, and finished consumer's goods were mostly imported from Japan. Fertilizer and textiles were two main import items. If the production of 1941 is taken as base, after the restoration, the production of textiles increased ten times and fertilizer increased five times by 1953 (7: p. 26). This is a sign that the economy of Taiwan has outstripped its colonial and dependent character and has become an autonomous system. In respect to education, the enrollment of Taiwanese school age children in primary school had attained 80% by the later years of Japanese occupation, but the secondary and higher education were very poor. After the restoration, if we take the figure of 1937 as a base and compare it with 1953, the growth of the number of students was as follows. Primary school: more than doubled; vocational and normal school: more than three times; middle school: six and an half times; college and junior college: more than eight times; university: more then twenty one times (7: p. 302). In order to rectify the defects of the colonial era, higher education was especially promoted.

The Japanese are no exception to the rule that each nation struggles for its own benefit. Now that the colonial era is at an end, it is our task to analyze the elements of social change in that era. Some useful references for planning of further social development may be drawn from our analysis.

III. SOCIAL CHANGE IN TAIWAN

Some aspects of social change which relate directly to population change, will be discussed in the following section.

7. *Political Background*

It is self-evident that population growth is deeply influenced by peace and war. The Japanese occupation of Taiwan in 1895 was met with a series of severe revolts. Between 1895 and 1901, the city of Taipei, the capital, was raided twice, the city of Taichung was also raided twice. Other military posts, local governmental offices and posts of military police were raided more than fifty times. A bigger uprising was suppressed in 1902, and after that several years passed in comparative tranquility. An insurrection broke out in 1907, and there were seven revolts between 1907 and 1915. During this period there were frequent uprisings against economic exploitation, as when

Note 5: Tachi, M.: Lecture on Population Problems, Tokio, 1943. p. 201.

48: Chen E-4 (no date) 1955 ADI Formosa ADI

rates of birth and death were more and more equalized. The difference between the highest and the lowest birth rate among different localities was 13.4 per 1,000 in 1906 but had fallen to 8.5 per 1,000 in 1935; the difference between the highest and the lowest death rate among different localities was 32.6 per 1,000 in 1906, but it was only 8.9 per 1,000 in 1935 (see Table 4, cf. 1: p. 169).

Table 4: The Highest and the Lowest Birth Rate, the Highest and the Lowest Death Rate of Different Prefectures of Taiwan in Selected Years (Rate: per 1,000 population)

		1906		1935				1906		1935	
Birth Rate		Whole Province	39.3	Whole Province	45.2	Death Rate		Whole Province	34.0	Whole Province	20.5
	The Highest	Nanto Prefecture	47.7	Tainan Prefecture	48.1		The Higheat	Chiai Prefecture	52.9	Taitung Prefecture	24.4
	The Lowest	Yansuika Prefecture	34.3	Taipei Prefecture	39.6		The Lowest	Hsinchu Prefecture	20.3	Penghu Prefecture	15.5
	Differece		13.4		8.5		Difference		32.6		8.9

Source: 10:1906, 1935.

13. *Agriculture and Industry*

To get primary agricultural products and processed agricultural products, especially rice and sugar, which Japan needed urgently, was one of the main policies of Japan in Taiwan. The colonial government had spent much of time and money for the promotion of the production of rice and sugar. They made various kinds of surveys, researches, and experiments, used the system of police and pao-chia for enforcement, and as a result, the outputs of rice and sugar had increased tremendously.

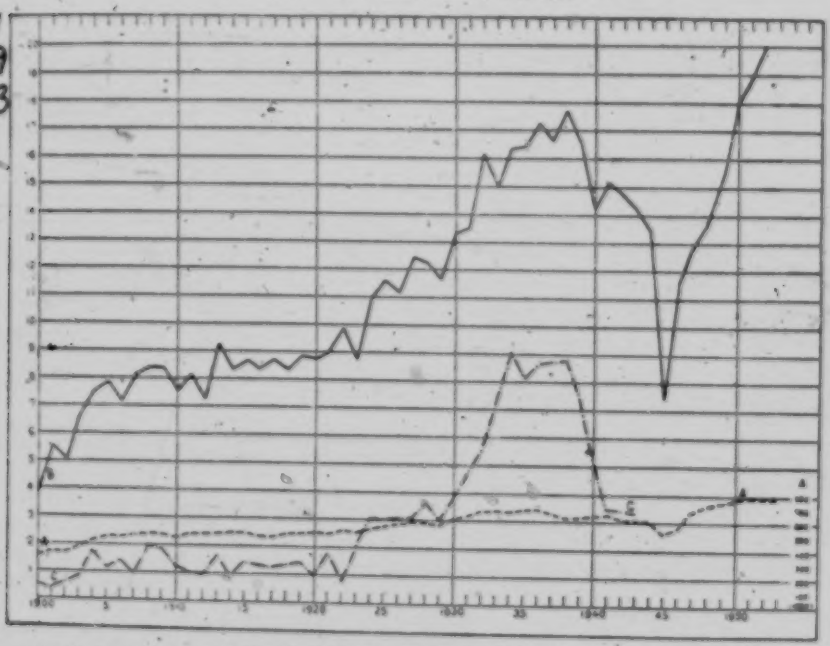
Among the various types of production in Taiwan, agriculture and manufacturing were the two main types, and the proportion occupied by forestry, fishery, and mining was rather small. In 1912, the value of the total output of all types of production amounted to 146,374 thousand yen. Among these, the proportion of agriculture was 63%, manufacturing was 32%, and the total of three other types (forestry, fishery, and mining) was only 5%. By 1942, manufacturing had developed fairly well, its production value had exceeded that of agriculture. The value of the total output of all types of production in 1942 was 1,515,627 thousand yen. Agriculture's share of this was 42%, manufacturing was 46%, and the total of three other types was 12%. Agriculture and manufacturing, the two main types of production, were again represented by rice and sugar respectively. The proportion of the value of rice to the total value of agricultural products was 59% in 1912, and 39% in 1942. The proportion of the value of sugar to the total value of manufactured products was 79% in 1912 and 42% in 1942. Considering these facts, it seems not unproper to take rice and sugar as representative of Taiwan production.

From figure 6 we can see, that in comparision with the increase of acreage of cultivation (line A), the increase in the output of rice (line B) was tremendously high.

48: Chen E-4 (no date) 1955 AD1 Formosa AD1

Productivity was raised by improvements in various aspects. The rapid increase in the output of rice from the 1920's was the result of the adoption of a new strain (Ponlai rice). By the 1930's, the production of rice in Taiwan was so large as to be twice its local demand, and the surplus rice was exported to Japan. Though the price of Taiwan rice was controlled by the Japanese government and the profit of trade in rice was mainly monopolized by big Japanese traders, the increase of production did have some benefits for Taiwanese, and no doubt, this contributed to the lowering of the death rate after 1920.

Fig. 6 Acreage of Cultivation, Amount of Production and Exportation of Rice, Taiwan, 1900-1963



A: Acreage of Cultivation (unit: 1,000 ha) B: Amount of Production (unit: 1,000,000 hectoliter)
C: Amount of Net Export (unit: 1,000,000 hectoliter)
Source, 1900-1948, from the Rice of Taiwan, 1949, Taipei.
1949-1962, from Taiwan Agricultural Yearbook, 1952, Taipei.

The condition of sugar was a little different from that of rice. The profit in sugar manufacturing was exclusively monopolized by the Japanese enterprisers. But it is undeniable that, in respect to the improvement of agricultural techniques and the raising of productivity, substantial effects were obtained.

As pointed out by W.S. Thompson, "underfeeding weakens the individual and renders him less resistant to disease, whether it be of the degenerative or of the germ

48: Chen E-4 (no date) 1955 AD1 Formosa AD1

type. When we find death rates regularly mounting to 30 or 40 per 1,000 we may be reasonably certain that undernourishment is one of the factors at work" (15: p. 50). Another author has remarked: "a survey based upon prewar conditions showed that half of the population of the world was then subsisting on an average daily consumption of less than 2,250 calories per capita, and that among these peoples the crude death rate averaged 30 or more per 1,000 population around 1930. On the other hand, only one fifth of the world's population was favored with an average daily per capita intake of 2,875 or more calories, and the countries containing these peoples had an average crude death rate as low as 12 per 1,000 around 1930" (28: pp. 62–64). From this data it is safe to conclude with W. S. Thompson that, "increased productivity is and always has been the absolute prerequisite for any substantial lowering of the death rate" (16: p. 70). In the period of 41 years between 1902 and 1942 the total population of Taiwan increased about 1.2 times, but the production of rice increased 1.9 times and sugar increased 19 times (Table 5). The increase of production far out ran the increase of population. No doubt, this was the basis for the decline of the death rate and the growth of population.

Table 5: The Increase in Production of Rice and Sugar and the Increase of Population in Taiwan in Selected Years, Actual Number and Index

	Output		Population	Index					
	Rice (1,000 Hectoliter)	Sugar (Metric Ton)	(1,000)	Rice		Sugar		Population	
1902	5,090	54,522	2,907	100.0		100.0		100.0	
1906	7,158	76,433	3,081	140.7	100.0	140.2	100.0	106.0	100.0
1912	7,300	175,587	3,354	143.4	102.0	322.1	229.7	115.4	108.9
1922	9,822	352,655	3,822	193.0	137.2	646.9	461.4	131.5	124.1
1932	16,144	989,050	4,843	317.2	225.5	1,814.0	1,294.0	166.6	157.2
1942	14,789	1,101,752	6,330	290.6	206.6	2,020.8	1,441.5	217.8	205.5

Source: Rice, 14: Table 303; Sugar, Taiwan Sugar Statistics; Population, 1902, 13; 1906-1942, 14: Table 64.

Besides the increase in productivity, all kinds of public works and establishments have a significant effect on the stability of life and the lowering of the death rate. Though we cannot stop drought, flood, or other calamities, we can mitigate the damage of these calamities by forestation and the regulation of water courses. Even the ill effects already suffered can be much lowered by public assistance and other systems of social work. The influenza of 1918–19 took over half a million lives in the U. S. and 15 million lives in India. The population of the U. S. at that time was around 100 million, so the death rate from influenza was about 5 per 1,000. The population of India at the same time was around 300 million, so the death rate of influenza was about 50 per 1,000 (17: p. 226; 15: p. 219). Why was the number of victims of influenza 10 times higher in India than in the U. S.? No doubt, the differences in the degree of

1:Gallin E-4,5 (1957-1958) 1966
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greater labor force, and this absorbed the men who had formerly worked in Lukang.

The expanded area of land under cultivation increased the food supply and generally improved the standard of living. In addition, the Japanese introduced some Western public health ideas and new means for controlling disease. Apparently, these factors are closely related to the extensive population growth which then began to take place in Taiwan. The Japanese also improved the primitive communication systems of the area. A major program of electrification and improvement of rail and bus lines was instituted throughout the heavily populated areas of the island.

The material influence of the Japanese occupation and administration of Taiwan was enormous. Not only did Japan create in Taiwan an important element of its colonial empire but in so doing it indirectly began to produce important economic changes which had implications for the development of the rural areas and the island itself. While agriculture provided the major portion of Taiwan's exports to the home country, new, imported commodities also became readily available to the Taiwanese villager at low prices; many inexpensive canned foods became common in the village household. In spite of these changes, the world depression had apparently little effect in the Hsin Hsing area. In fact, few villagers were even aware that there was a world depression in 1929 and in the 1930's, which may be due to the almost total lack of industry in rural Taiwan or in Taiwan generally at that time.

The advent of the Japanese brought a higher standard of living for the Taiwanese people, but the improvements were offset by the war with China in 1937 and, more notably, by the entrance of the United States into the war in 1941. Japan had to muster all its own resources and those of its colonies, and good times soon turned into hard times for the Taiwanese farmer. At first, village men were lured off the land to work at high pay on Japanese construction projects, and others were conscripted to work in Japanese army labor gangs in both Taiwan and in Southeast Asia. Often families were left with only the women, children, and old men to work the land. The supply of artificial fertilizer which had been so important in developing intensive rice cultivation was almost completely cut off. The little food that could be produced under these difficult conditions was usually confiscated by the Japanese authorities to supplement the food supplies in Japan, and villagers were frequently reduced to a diet consisting mostly of sweet potatoes. The gratitude they had felt for the prewar accomplishments of the Japanese was offset by the severity of Japanese rule during the hard war years.

The defeat of the Japanese and the coming of the Chinese National-

52:Steiner S-4 (no date)1951
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427 acres) as a measuring stick for rental calculation. It varies with the fertility of land in different sections of Taiwan. To prepare the farmers for the acceptance of the program, 9,937 persons were sent to the rural areas in 1949 to acquaint them with the operational details. They were followed by 1,257 trained persons who helped farmers to readjust their rental contracts. By November 1949, 306,473 families were given "37.5-contracts" in conformity with the program. Finally, 26 provincial inspectors toured the island to check the results. 434 The income of the tenant farmers was estimated to have registered an average gain of 30 per cent, ranging from 0.9 per cent to as high as 70 per cent in comparison with the pre-reform period.[81]

653 Pertinent to rural rehabilitation are the public works being done in dike repair and construction, irrigation, and land reclamation. Briefly, from 1947 to 1950, some 10,983 meters of new dikes were built, in addition to 65,288 meters repaired. Since 1946 a yearly average of 9,072 hectares of land has been brought under irrigation, in comparison to an average of 9,428 hectares under the Japanese.[82]

433 A review of statistics also shows varying degrees of gains in agricultural production.[83] For instance, for 1950 the

NT$1,432,000,000 (*Taiwan Today*, cited note 11 *supra*, pp. 59–61).

[81] For statistical data on the rent reduction program, see Land Bureau, Taiwan Provincial Government, *37.5 Rent Reduction Program** (Taipeh, 1949), pp. 1, 19, 34; *Taiwan Today*, cited note 11 *supra*, p. 90; *Taiwan Reconstruction**, cited note 12 *supra*, Vol. 2, p. 383; Vol. 1, p. 25.

[82] *Taiwan Reconstruction**, cited note 12 *supra*, Vol. 1, pp. 227–28, also for comprehensive data, pp. 227–43. For a general descriptive and statistical presentation of the subject, see Taiwan Provincial Government, *Water Conservancy and Irrigation**, Taipeh, 1949; also *Reclamation of Waste-land**, Taipeh, 1949.

[83] For detailed statistical data on agricultural production, see Taiwan Provincial Gov-

[P. 218 (81)]

433 figure for rice acreage registers an increase of 156 per cent over 1945, while the rice yield shows an increase of 221 per cent. There are also gains in sweet potatoes, wheat, sugar cane, tea, fruits, and other agricultural produce. Among the factors contributing to this growth are the fertilizer assistance program under ECA, incentive generated by the rent reduction program, irrigation and reclamation projects, and rural co-operative projects, health work, and improved-seed distribution sponsored by the Chinese-American Joint Committee of Rural Rehabilitation.[34]

Industry

439 The Nationalist policies toward industry may be reflected by a general description of the industrial situation in Taiwan. Prior to 1945, the island was tied to Japanese over-all economy. Its agrcultural productivity, for instance, was dependent on fertilizer imports from Japan. Other products, such as camphor and certain metal-bearing ores, were shipped to Japan for further processing. In recent years there has been a trend toward integration of industries. 387 The production of fertilizer, for example, has been stepped up from a 1945 low of 400 metric tons to an estimated 92,000 tons in 1951.[35] This is against an estimated 1951 demand of 340,000 metric tons in rice and sugar-cane fields 000 alone.[36] Since March 1948, a refining

ernment, *Report on Food Production** (Taipeh, 1949), pp. 33–41; *Taiwan Reconstruction**, cited note 12 *supra*, Vol. 2, pp. 383–402; *Taiwan Today*, cited note 11 *supra*, pp. 77–98.

[34] Raymond T. Moyer, "Economic Administration Program in Taiwan," address before the Chinese Association for the United Nations, March 17, 1951.

[35] *Taiwan Today*, cited note 11 *supra*, p. 108; *Taiwan Reconstruction**, cited note 12 *supra*, Vol. 2, p. 481 (1950 production was estimated to be 55,000 metric tons).

[36] *Taiwan Today*, p. 107; also cf. *Taiwan*

[P.219(A)]

52:Steiner S-4 (no date)1951
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625 wine, tobacco, and salt in violation of government monopoly, and violations of the 37.5 rent reduction program.

Conclusions

643 In describing the Nationalist government policies, 1949–51, the writer has sought to ascertain their nature and contents by recounting a chain of events which set the political pattern in contemporary Taiwan and by a survey of what has taken place since. From them may be drawn the following tentative conclusions:

1. Generalissimo Chiang Kai-shek and his supporters have been exercising a dominant role in National Government policies, 1949–51.

665 2. While there are three known political parties active in national politics in Taiwan, the Kuomintang, as presently constituted, is the ruling party.

631 3. The political framework in Taiwan may be described as one of over-all political control by the Nationalist government, centralized management by the provincial government, and local self-government, still in its preliminary stage, at the municipal and county levels.

652 4. The National Taiwan currency has exhibited a degree of stability which compares favorably with that in most postwar countries having suffered from war devastation.

5. Nationalist government assets and reserve, sale of government properties, and ECA assistance are contributing factors in balancing the provincial budgets in recent years.

427 6. The 37.5 rent reduction program has contributed towards rural well-being, along with the projects sponsored by the Joint Committee on Rural Rehabilitation.

433 7. There has been an upward trend in agricultural and industrial produc-

[p. 222 (B)]

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433 tion, the latter being evident mostly in government-owned enterprises.

000 8. Schools on all levels have shown a gain in enrollment.

9. At this distance, it is impractical to evaluate the Nationalist political leadership as presently represented in Taiwan. Nor is it possible to ascertain the extent of its ability either in inspiring hope, faith, and confidence among the people or in initiating a democratic political atmosphere which "loves freedom, encourages independent thinking, and tolerates those whose views are dif-

[p. 223 (A)]